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THE UNIVERSITY OF ALBERTA
A STUDY OF THE CLASSROOM VERBAL TEACHING BEHAVIOR OF
OPEN-MINDED AND CLOSED-MINDED STUDENT TEACHERS
INSTRUCTED IN FLANDERS' INTERACTION ANALYSIS

by



ROBERT MELVILLE ANDERSON

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "A Study of the Classroom Verbal Teaching Behavior of Open-Minded and Closed-Minded Student Teachers Instructed in Flanders' Interaction Analysis," submitted by Robert Melville Anderson in partial fulfilment of the requirements for the degree of Master of Education.

ABSTRACT

This study investigated the possibility of a relationship between the strength of a student teacher's belief-disbelief system and his classroom verbal teaching behavior. The specific problem of this study guiding the inquiry was as follows: Do open-minded and closed-minded student teachers in secondary education who have been instructed in the Flanders method of Interaction Analysis differ in their classroom verbal behavior in teaching junior high school social studies discussion lessons?

In order to investigate the problem, nine¹ open-minded and ten closed-minded student teachers who had been identified by the Rokeach Dogmatism Scale, Form E, and who had received approximately fifteen hours of instruction in Interaction Analysis were randomly selected from a population of seventeen open-minded and seventeen closed-minded, pre-service education students at the University of Alberta.

To control as many variables in the data analysis as possible, the student teachers were observed during their second session of student teaching, leading social studies discussions in classes of students described as average in ability and achievement. As well, the student teachers were in Edmonton junior high schools that served middle-class socio-economic areas.

On two separate occasions for a total of forty minutes, each student teacher was observed by a trained observer using

¹Ten were selected, but one later withdrew from practice teaching.



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Flanders' Interaction Analysis as a tool for observation. The data thus obtained were tabulated on percentage matrices. Composite percentage matrices depicting each group's verbal interaction pattern were then used to analyze differences in verbal behavior between the open- and closed-minded groups.

The t-test results of twenty-one hypotheses led to the conclusion that there were observed differences between the classroom verbal behavior of open-minded and closed-minded student teachers who had been instructed in the Flanders method of Interaction Analysis. This difference occurred even though there was no significant difference between groups in total percentages of teacher talk and student talk.

Among the findings were ten significant differences. Open-minded student teachers exhibited more indirect verbal teaching behavior as compared with direct verbal teaching behavior, according to the I/D and i/d ratios, than did the closed-minded student teachers. They used more praise after a student-initiated idea, exhibited more acceptance and clarification of student talk, and exhibited more extended acceptance and clarification of student talk than the closed-minded student teachers did. They lectured less, gave fewer directions and criticized less than did the closed-minded student teachers. Lastly, there was less student talk in response to the teacher, and less extended talk in response to the teacher during the classes of the open-minded student teachers than during the classes of the closed-minded student teachers.

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CHAPTER I

THE PROBLEM

I. PURPOSE

The purpose of this study was to add some empirical evidence to the growing body of knowledge concerning classroom verbal teaching behavior by investigating the possibility of a relationship between the strength of a student teacher's belief-disbelief system and his classroom verbal teaching behavior. The specific problem of this study guiding the inquiry was as follows: Do open-minded and closed-minded student teachers in secondary education who have been instructed in the Flanders method of Interaction Analysis differ in their classroom verbal behavior in teaching junior high school social studies discussion lessons?

II. NEED

The subjects of this study had been instructed in the Flanders method of Interaction Analysis. Amidon and Flanders (1967, p.5) state that it is a system for the observation and analysis of teacher behavior in the classroom and that it is used in understanding and changing this behavior. This method analyzes classroom verbal discourse by quantifying the social-psychological dimension of teacher and student classroom verbal behavior.

Research has indicated that the degree of a student

teacher's dogmatism could be a factor in his classroom verbal behavior, even after he has been trained in Interaction Analysis (Hough and Amidon, 1965; Zahn, 1965). However, these studies have stopped short of research in the classroom. A need exists, therefore, for empirical evidence gained from the classroom observation of student teachers. This study is a response to this need. If a relationship is found between the strength of a student teacher's belief-disbelief system and his classroom verbal teaching behavior, the researcher believes that this finding and its implications could be useful to the student teacher, his instructors and his supervisors.

III. PROCEDURE

Ten closed-minded student teachers and nine open-minded student teachers, classified according to the Rokeach Dogmatism Scale, Form E, were observed during their second session of practice teaching. They had been randomly selected as subjects for this study from a population of seventeen open-minded and seventeen closed-minded student teachers. Out of a total group of ninety-two student teachers, this population was randomly chosen from those who received the thirty-four highest and the thirty-four lowest scores on the Dogmatism Scale.

The subjects had been instructed in the Flanders method of Interaction Analysis. The investigator used Interaction Analysis to tally each student teacher on two different occasions for a total of forty minutes while a junior high school social studies lesson was being conducted. The tallies

were then placed on individual matrices. Analysis of selected portions of each matrix enabled the hypotheses of this study to be tested.

IV. SCOPE AND LIMITATIONS

The observed differences and similarities in classroom verbal behavior of social studies student teachers were analyzed. Achievement in student teaching was not a factor in this study.

Limitations which may have a bearing on this study are the following:

(1) There was no attempt to control the content nor the teaching style of the student teachers' discussion lessons.

(2) There was no attempt to control the influence, if any, of the co-operating teachers upon the student teachers.

(3) It was assumed that no change occurred in the degree of each student teacher's open- or closed-mindedness during the interval of six months between the time the Dogmatism Scale was administered and the time of the classroom observations.

(4) A general classification of the junior high school students according to intelligence, achievement and socio-economic status was considered adequate.

V. DEFINITION OF TERMS

The following terms are defined as they apply to this investigation.

Belief-Disbelief System--is an organization of verbal and nonverbal, implicit and explicit beliefs, sets, or expectancies maintained by an individual (Rokeach, 1960, p.32).

Open and Closed Belief-Disbelief System¹--is a numerical rating as measured by the Rokeach Dogmatism Scale, Form E. A high score indicates a closed belief-disbelief system and a low score indicates an open belief-disbelief system.

Flanders' Interaction Analysis System--is a ten-category system which analyzes classroom verbal discourse by quantifying the social-psychological dimensions of teacher and student classroom verbal behavior.

Direct Teaching Behavior--consists of three of Flanders' observation categories: (1) lecturing, (2) giving directions, and (3) criticizing or justifying authority.

Indirect Teaching Behavior--consists of four of Flanders' observation categories: (1) accepting feeling, (2) praising or encouraging, (3) accepting ideas, and (4) asking questions.

I/D Ratio--is an index of indirect-direct teaching behavior. The total percentage of tallies in matrix columns 1, 2, 3, and 4 of Flanders' categories is divided by the total percentage of tallies in matrix columns 1, 2, 3, 4, 5, 6, and 7 of Flanders' categories.

¹Open and closed belief-disbelief system, open and closed-mindedness, and low and high dogmatism are terms used synonymously by Rokeach, and in this study.

i/d Ratio--is a sharpened index of indirect-direct teaching behavior. The total percentage of tallies in matrix columns 1, 2, and 3 of Flanders' categories is divided by the total percentage of tallies in matrix columns 1, 2, 3, 6, and 7 of Flanders' categories.

Student Teacher--is a University of Alberta undergraduate education student who practices teaching in a regular classroom for two, separate, five-week sessions. The student teaches half-days as he continues to attend his university classes.

Discussion Lesson--consists of classroom verbal interaction between the student teacher and students, and among the students themselves. The content and method of this interaction are decided upon by each student teacher.

Observation--is a twenty-minute period during which the researcher uses Flanders' Interaction Analysis as a tool to record the classroom verbal interaction that is taking place.

Tally--is a number representing the Flanders category of verbal behavior which has just occurred in the classroom. A number is written at least every three seconds.

VI. HYPOTHESES

It was believed that the strength of a student teacher's belief-disbelief system would be an important factor in his classroom verbal behavior. Open-minded student teachers, it was thought, would teach more indirectly than closed-minded student teachers.

Research by Rokeach (1960), Kemp (1962), Hough and Amidon (1965), and Zahn (1965) led the researcher to assume that open-mindedness is correlated with indirect teaching and that closed-mindedness is correlated with direct teaching. These assumptions form the basis for the hypotheses of this investigation. Research has also explicated characteristics of indirect and direct teaching. These characteristics determine the nature of the prediction made in each hypothesis.

The following hypotheses will be tested for general differences between the classroom verbal behavior of open-minded and closed-minded student teachers.

Hypothesis 1: There will be a smaller percentage of teacher talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 2: There will be a greater percentage of student talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 3: Open-minded student teachers will have a larger index of indirect-direct teaching behavior as classified by the I/D ratio than the closed-minded student teachers will.

Hypothesis 4: Open-minded student teachers will have a larger index of indirect-direct teaching behavior as classified by the i/d ratio than the closed-minded student teachers will.

The following hypotheses will be tested for specific

differences between the classroom verbal behavior of open-minded and closed-minded student teachers. Each of Flanders' categories will be analyzed.

Hypothesis 5: A larger percentage of class time will be categorized as acceptance and clarification of student feeling in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 6a: There will be no difference in the percentage of class time categorized as praise or encouragement by the teacher between the classes of the open-minded student teachers and the classes of the closed-minded student teachers.

Hypothesis 6b: A larger percentage of class time will be categorized as extended praise or encouragement over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 6c: A larger percentage of class time will be categorized as praise or encouragement of a student-initiated idea in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 7a: A larger percentage of class time will be categorized as acceptance or use of student ideas in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 7b: A larger percentage of class time will be categorized as extended acceptance or use of student ideas over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 8a: There will be no difference in the percentage of class time categorized as teacher questioning between the classes of the open-minded student teachers and the classes of the closed-minded student teachers.

Hypothesis 8b: A larger percentage of class time will be categorized as extended teacher questioning over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 9a: There will be no difference in the percentage of class time categorized as teacher lecturing between the classes of the open-minded student teachers and the classes of the closed-minded student teachers.

Hypothesis 9b: A larger percentage of class time will be categorized as extended teacher lecturing in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

Hypothesis 10: A larger percentage of class time will be categorized as teacher giving directions in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

Hypothesis 11: A larger percentage of class time will be categorized as criticism or justification of authority by the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

Hypothesis 12a: A larger percentage of class time will be categorized as student talk in response to the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

Hypothesis 12b: A larger percentage of class time will be categorized as student talk extended over three seconds in response to the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

Hypothesis 13a: A larger percentage of class time will be categorized as student-initiated talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 13b: A larger percentage of class time will be categorized as student-initiated talk extended over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers.

Hypothesis 14: A larger percentage of class time will be categorized as silence or confusion in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers.

VII. ORGANIZATION OF THE STUDY

The aim of this first chapter was to introduce the study. To this end, the purpose, the need, the procedure, and the scope and limitations for the investigation were presented; terms were defined and the hypotheses were set down. In Chapter II, research relevant to this study is reviewed. The method of investigation is presented in Chapter III. In Chapter IV, the data obtained during the classroom observations are analyzed and the findings are reported. These findings are interpreted and conclusions are drawn in Chapter V. Lastly, the investigation is summarized, implications are drawn, and recommendations for further research are suggested in Chapter VI.

CHAPTER II

REVIEW OF RELATED RESEARCH

Flanders' method of Interaction Analysis developed from social-psychological research concerning the social-emotional climate of the classroom. Flanders' theories are concerned mainly with the role that teacher verbal behavior performs in creating this climate. Therefore, this chapter reviews research unique to teacher verbal behavior.

I. EARLY STUDIES OF TEACHER BEHAVIOR

One of the earliest approaches to the analysis of teacher behavior was that used by Anderson (et al., 1945, 1946a, 1946b). He investigated "dominative" and "integrative" contacts between teachers and pupils. These two types of behavior were explained thus:

The use of force, commands, threats, shame, blame, attacks against the personal status of an individual may be cited as examples of dominative ways of responding to others. Behavior is said to be dominative when it is characterized by a rigidity or inflexibility of purpose, by an inability or an unwillingness to admit the contribution of another's experience, desires, purposes, or judgment in the determining of goals which concern others
. . . .

If, instead of compelling the companion to do as one says, one asks the companion and by explanation makes the request meaningful to the other so that the other can voluntarily co-operate, . . . the term socially integrative behavior is used (1945, p.9).

Anderson and his colleagues began their work by observing the contacts of nursery school children. Later, they focused on the pupil-teacher contacts of children in the

elementary school. Using an observation scale to record teacher contacts and patterns of pupil behavior in classrooms, they studied five teachers over a period of several years. The results that emerged from this research indicate the importance of the teacher's role in the classroom.

(1) The dominative and integrative contacts of the teacher set a pattern of behavior that spread throughout the classroom (1946a, p.124).

(2) The behavior of the teacher, more than that of any other individual, set the climate of the classroom (1946a, p.124-125).

(3) The pattern that a teacher developed in one year was likely to persist in his classroom the following year with different pupils (1946b, p.153).

(4) High frequencies of teacher integrative behavior were associated with high frequencies of socially integrative behavior in the pupils, and with high frequencies in expression of spontaneity and initiative (1946a, p.87).

(5) High frequencies of teacher dominative behavior were associated with pupils being easily distracted from their schoolwork (1946a, p.124).

At the same time, but independent of Anderson's work, Lippit and White (1943) carried on investigations of the social climate of boys' clubs. A number of boys' clubs, with five members each, were organized and given experiences with "authoritarian leadership" consisting of dominative contacts, "democratic leadership" consisting of integrative contacts,

and "laissez-faire leadership" consisting of infrequent integrative contacts coupled with attitudes of indifference. Leadership styles were role-played and rotated throughout the various groups. Records of social interaction between group members and their leader, and stenographic records of the conversation in each club were made by observers. The major findings were the following:

(1) That different leadership styles produced different social climates that resulted in different group individual behaviors.

(2) That conversation categories differentiated leader-behavior techniques more adequately than social-behavior categories.

(3) That autocratic leadership elicited either an aggressive rebelliousness towards the leader or an apathetic submission to the leader.

(4) That leadership style was the primary factor in producing climatological differences, and that club personnel was of secondary importance (Withall, 1949, p.348).

The similarity between the findings of Anderson et al., and Lippit and White aroused the interest of Withall. He developed an objective technique for measuring the social-emotional climate in the classroom (Withall, 1949). Teachers' statements were classified into seven categories, producing an index of teacher behavior which paralleled that of Anderson's. A continuum from "learner centeredness" to "teacher centeredness" existed in the seven categories. The technique was found to be reliable and valid.

Using Withall's "learner centered" and "teacher centered" concept, Flanders (1951) created a laboratory situation in which two adults were trained to interact spontaneously

with student subjects.

The student's behavior was indicated by (1) a record of their verbal statements; (2) the use of a lever, hidden from the teacher's view, to indicate positive and negative feelings associated with achievement tasks; and (3) the student's pulse and palmer skin resistance. Among his findings were the following:

(1) "Teacher centered" behavior elicited student behaviors of hostility toward self or the teacher, withdrawal, apathy, and aggressiveness.

(2) "Learner centered" behavior elicited student behaviors of problem orientation, decreased interpersonal anxiety and integration (Flanders, 1951, p.110).

From the above studies, Flanders, during the 1950's, evolved his method of Interaction Analysis. The system classified all teacher statements as either indirect or direct.¹ Indirect corresponds to the integrative, democratic, and learner-centered terms discussed previously and direct corresponds to the dominative, authoritarian and teacher-centered terms. This classification gives central attention to the amount of freedom the teacher grants to the student (Amidon and Flanders, 1967, p.6).

¹Cf., p. 34.

II. RESEARCH CONCERNING INDIRECT AND DIRECT TEACHING

Data collected from 1955 to 1957 in schools in Minnesota and New Zealand provided the basis for Flanders' research (Flanders, 1965). For the major study during this period, pupils' perceptions of their teachers were assessed by an attitude inventory, given to seventy-five social studies and mathematics classes. The sixteen classes with the most favorable attitudes toward their teachers and the sixteen classes with the least favorable attitudes were studied.

Each of the thirty-two teachers, sixteen in mathematics and sixteen in social studies, taught a two-week unit that had been prepared by Flanders. He also had prepared achievement tests. Pre- and post-tests provided an adjusted achievement score for each student. While the unit was taught, each teacher was observed by researchers using Interaction Analysis. A comparison of student attitudes, student achievement and teacher verbal behavior produced the following, thought-provoking findings:

(1) A significant relationship was found between high student achievement and favorable attitudes, and the use of indirect teacher behavior.

(2) A significant relationship was found between low student achievement and non-favorable attitudes, and the use of direct teacher behavior.

(3) Those teachers classed as indirect acted more indirectly when goals were being clarified and when new content

material was being introduced. They acted more directly after goals had been clarified and work was in progress (Flanders, 1965, pp.113-115).

Many findings of this extensive project are particularly pertinent to the present study. Flanders concluded that calculating the ratio of the use of indirect and direct teacher verbal behavior was an adequate way of identifying teachers whose influence patterns were alike (p.74). Specific comparisons between indirect and direct teachers revealed the following:

(1) Indirect teachers used category one--acceptance of feeling--three times as much as did direct teachers. However, this category was used rarely by both groups (p.76).

(2) Indirect teachers used category three--acceptance and clarification of ideas--three times as much as did direct teachers. This category was used for extended periods of time by the indirect teachers six times as often as by the direct teachers (pp.75-76).

(3) Indirect teachers gave fewer directions and criticized less than did direct teachers (p.77).

(4) Verbal participation of the students in the classes of "most indirect" teachers tended to be slightly more than in the classes of "most direct" teachers (p.88).

(5) In the classes of indirect teachers, less time was noted for periods of silence or confusion than in the classes of direct teachers (p.73).

Subsequent research has supported Flanders' original

findings. This research has consistently correlated student achievement with indirect teaching patterns. As well, characteristics of indirect teaching have been further explicated.

Amidon and Flanders (1961) employed a laboratory research design to investigate the effects of direct and indirect teacher behavior on the achievement of eighth-grade geometry students. A specially-trained teacher role-played both a very direct and a very indirect teacher in four classes of students that had received high scores on a test of dependency proneness. It was found that students under indirect teacher influence scored significantly higher on achievement tests than did the students under direct teacher influence. These results occurred both when the students' perceptions of the learning goal were clear and when they were not clear.

An unusual and inventive study by Furst in 1966 resulted in analogous findings to those of Amidon and Flanders. She replicated a previous study by reanalyzing a set of audio tapes. Using Interaction Analysis, she identified relationships between teacher influence patterns and student achievement.

Furst found that above-average student achievement was positively related to indirect teacher influence, a moderate pace of teacher-pupil interaction and an indirect response to student talk. She also found that the amount of student talk was positively related to student achievement (Amidon and Flanders, 1967, p.87).

Soar (1967) carried out research in the classroom. He used the Flanders method of Interaction Analysis to observe fifty-six elementary school teachers. Before and after the observations, Soar administered vocabulary and reading tests

in the classrooms. His findings enabled him to conclude that indirect teaching produced greater growth in reading comprehension than did direct teaching.

Are certain patterns of verbal behavior characteristic of superior teachers? Amidon and Giammatteo (1965) undertook a study involving 153 elementary school teachers in order to explore this question. Thirty-three teachers were first identified as superior by their administrators and supervisors. In order to provide an average group, 120 teachers were selected at random. All 153 teachers were then observed by trained observers who used the Flanders system of Interaction Analysis.

When the teaching patterns of the two groups were compared, the "superior" teachers were found to use a much more indirect influence pattern than the "average" teachers. The findings elucidate characteristics of indirect and direct teaching. Among their findings were the following:

(1) Statements indicating acceptance of feeling were used about three times as much by the "superior" teachers as by the "average" teachers. As Flanders had found, this category was used extremely infrequently.

(2) Statements of praise were used equally by both groups, but the "superior" teachers praised pupil-initiated ideas and gave reasons for their praise more often than did "average" teachers.

(3) Statements that indicated acceptance and use of student ideas were used more than twice as much by the "superior" teachers as by the "average" teachers.

(4) The total percentage of teacher questioning was about the same in each group. However, the "superior" teachers asked more questions that were broad in nature and demanded pupil-initiated talk, while the "average" teachers tended to ask narrow questions that called for predictable responses.

(5) Total lecture time accounted for an equal amount of time for each group but extended lecturing was done more by the "average" teachers than by the "superior" teachers.

(6) Statements containing criticism or direction-giving were used about twice as much by the "average" teachers as by the "superior" teachers.

(7) There were twice as many pupil-initiated statements in the classes of the "superior" teachers as in the classes of the "average" teachers.

(8) Periods of silence or confusion occurred twice as often in the classes of the "average" teachers as in those of the "superior" teachers.

Pankratz (1966) studied high school physics teachers in a manner similar to Amidon and Giammatteo. His classification of teachers was more precise, however. Thirty teachers were rated according to the Teacher Rating Scale, the Student Opinion Questionnaire, and the Teaching Situation Reaction Test. Five teachers scoring highest on these tests and five teachers scoring lowest were observed by Pankratz, who used the Amidon modification of the Flanders system as a tool of analysis.

Differences in verbal behavior between the two groups

were extreme. The influence patterns of the high-scoring teachers were almost exactly similar to the influence patterns of the superior teachers of Amidon and Giammatteo's study. A similar correlation occurred between the low-scoring teachers and Amidon and Giammatteo's average teachers.

III. RESEARCH CONCERNING TRAINING IN INTERACTION ANALYSIS

Flanders (1962) established that teachers would change the pattern of their verbal teaching behavior if they received instruction in his system. He instructed fifty-five teachers in Interaction Analysis for thirty hours over a period of nine weeks. The teachers were observed by trained observers using Interaction Analysis for six hours in their classrooms before and after the training sessions. Analysis revealed a significant change in classroom verbal behavior toward the use of more indirect behavior after the training sessions.

The first project which utilized Interaction Analysis in pre-service teacher education was conducted by Hough and Amidon in 1964. They taught Interaction Analysis to one group of student teachers; the other group studied learning theory. College supervisors, they found, rated the student teachers who had been taught Interaction Analysis as better than student teachers who had been taught learning theory. They also reported that the student teachers who had been exposed to Interaction Analysis made significant positive gains in their attitudes toward teaching, while there were no significant

changes in attitudes in the group that had been taught learning theory (Amidon, n.d., pp.17-18).

Their research initiated a series of studies in which training in Interaction Analysis was given to student teachers at both elementary and secondary grade levels. A similar conclusion has been reported by all these studies: student teachers trained in Interaction Analysis exhibit more indirect patterns of teaching behavior and less direct patterns of teaching behavior than student teachers not so trained.

Furst (1965) used Interaction Analysis to observe and analyze thirty, secondary English and social studies student teachers in a study designed to compare student teachers taught Interaction Analysis with those not taught such a system. Also investigated was the effect of the timing of the training. Furst concluded that student teachers taught Interaction Analysis differ significantly from student teachers not taught Interaction Analysis in their use of (1) more total acceptance of student ideas; (2) more total accepting behavior; (3) less rejection of student behavior; and (4) less total rejecting behavior. The timing of the training in Interaction Analysis was found to have no effect on these behavioral differences.

In 1966, findings from a two-year course revision and research project at Ohio State University were reported (Hough and Ober, 1967). A thirteen-category modification of Flanders' method had been taught to 420 education students. Data from this project showed a tendency towards greater use of categories of indirect influence during simulated teaching

experiences by students taught Interaction Analysis. A tendency toward the use of more direct influence was apparent during simulated teaching experiences by students not taught Interaction Analysis.

Lohman (1966) extended this research one further stage. He used Interaction Analysis to observe sixty of Hough and Ober's subjects during their student teaching experiences. They were teachers of four subjects at the secondary level--English, mathematics, science, and social studies. Thirty of them had been instructed in Interaction Analysis four to twelve months prior to their student teaching.

The two groups differed significantly in their patterns of verbal teaching behavior. Lohman found that the student teachers previously instructed in Interaction Analysis (1) made less use of total teacher talk; (2) lectured less; (3) gave fewer directions; (4) accepted and clarified student ideas more often; (5) exhibited more indirect teaching behavior as opposed to direct teaching behavior; and (6) had more student talk and spontaneous student talk in their classes than did the student teachers not previously instructed in Interaction Analysis.

Elementary school student teachers were studied by Kirk (1965). Utilizing Interaction Analysis, he observed thirty student teachers before and after fifteen of them were taught the Flanders method. They were observed while leading free discussion classes in social studies. He found that the group which had been taught Interaction Analysis talked less,

evoked more pupil-initiated ideas, and more often accepted pupil ideas than did the student teachers not instructed in Interaction Analysis. Furthermore, he concluded that indirect student teaching, and training in Interaction Analysis appeared to be related. Another conclusion has relevance to the identification of indirect teaching and will have a bearing on the investigation of the problem in the present investigation, which studies secondary school student teachers.

Although student teachers, when taught the rudiments of the Minnesota (Flanders) system, can be definitely characterized as becoming more indirect, the indirectness is not caused by a total increase or by a proportionate total increase in indirect statements. The factor causing indirectness is the ratio between the number of direct influence attempts and the number of indirect influence attempts (Pankratz, 1966).

Moskowitz (1966) studied the effects of training in Interaction Analysis, both on student teachers and on co-operating teachers. Forty-four secondary education student teachers and their co-operating teachers were selected as subjects. One-half of the co-operating teachers and one-half of the student teachers received training in Interaction Analysis. Each co-operating teacher and each student teacher was observed during a discussion-type lesson by a person trained in Flanders' system. The subjects taught were English, social studies, mathematics, and science. Among the findings were these:

(1) There were no significant differences in the amounts of teacher talk and student talk between the classes of trained and untrained co-operating teachers. However, the trained co-operating teachers used significantly more indirect

teaching patterns than did the untrained co-operating teachers.

(2) Trained student teachers used significantly more indirect teaching patterns than did their untrained co-operating teachers.

(3) Trained co-operating teachers and trained student teachers who worked together used significantly more indirect teaching patterns than did untrained co-operating teachers and untrained student teachers who worked together.

An interesting conclusion was that "it appears that the trained student teachers resisted the tendency to emulate their untrained co-operating teachers, and therefore resisted becoming direct" (Moskowitz, 1966, p.117). This study indicates that student teachers, when trained in Interaction Analysis, will teach more indirectly than they would when not so trained, regardless of the influence of the co-operating teacher.

IV. RESEARCH CONCERNING DOGMATISM AND STUDENT TEACHERS

"Apparently, the immediate effect of teaching student teachers Interaction Analysis is to help them become more indirect in working with pupils" (Amidon, n.d., p.143). Do all student teachers become equally indirect as a result of training in Interaction Analysis? There are indications that the amount of indirect teaching exhibited by these student teachers is related to the strength of their belief-disbelief systems. The theoretical basis for this statement is provided by the research of such people as Hough and Amidon (1965),

and Zahn (1965). Their research relating dogmatism and type of classroom teaching stems from the extensive investigation of belief-disbelief systems by Rokeach (1960).

Rokeach conceives the belief-disbelief system as an organization of verbal and nonverbal, implicit and explicit, beliefs, sets, or expectancies.

The belief system is conceived to represent all the beliefs, sets, expectancies, or hypotheses, conscious and unconscious, that a person at a given time accepts as true of the world he lives in. The disbelief system is composed of a series of subsystems rather than merely a single one, and contains all the disbeliefs, sets, expectancies, conscious and unconscious, that, to one degree or another, a person at a given time rejects as false (Rokeach, 1960, p.33).

He assumes that belief-disbelief systems serve two powerful and conflicting needs at the same time: the need for a cognitive framework to know and to understand, and the need to ward off threatening aspects of reality (p.67). Both needs operate together to one degree or another. "A person will be open to information insofar as possible, and will reject it, screen it out, or alter it insofar as necessary" (p.68). Thus, the belief-disbelief system acts as a filter which distorts the reality of some stimuli and screens out others. If this is true, and research has not refuted these assumptions, it would appear a simple task for a person with a closed belief-disbelief system to distort or screen out many aspects of such an abstraction as the Flanders method of Interaction Analysis.

In order not to distort or screen out aspects of Interaction Analysis, a student teacher must be able to evaluate

adequately the information he receives concerning the Flanders method.

We assume that, in any situation in which a person must act, there are certain characteristics of the situation that point to the appropriate action to be taken. If the person reacts in terms of such relevant characteristics, his response should be correct, or appropriate. The same situation also contains irrelevant factors, not related to the inner structure or requirements of the situation. To the extent that response depends on such irrelevant factors, it should be unintelligent or inappropriate. Every person, then, must be able to evaluate adequately both the relevant and irrelevant information he receives from every situation (p.57).

Investigating the ability of people to evaluate adequately, relevant and irrelevant information led Rokeach to suggest a basic characteristic defining the extent to which a person's belief-disbelief system is open or closed; namely, "the extent to which the person can receive, evaluate, and act on relevant information received from the outside on its own intrinsic merits, unencumbered by irrelevant factors in the situation arising from within the person or from the outside" (p.57).

From this theoretical foundation, Rokeach investigated behavioral differences between open- and closed-minded people over a period of nine years. His findings are applicable to the problem of a student teacher integrating the theories of Interaction Analysis, as Flanders' method of Interaction Analysis is still experimental and would probably be viewed as a new learning situation. Among his findings were the following:

(1) Persons with relatively closed systems, as measured by the Dogmatism Scale, have more difficulty than

those with relatively open systems integrating new beliefs into new systems (p.205). The capacity to integrate is seen to be related to, and possibly a function of, a greater capacity to remember the elements to be integrated.

(2) Closed-minded persons have greater difficulty than open-minded persons in forming new conceptual and perceptual systems (p.284).

(3) Closed-minded persons reject an experimental situation more than do open-minded persons (p.196).

Critical thinking would seem to be an important factor in the integration of any new belief. Kemp (1960) has correlated the ability to think critically with the strength of belief-disbelief systems. From a population of 500 university students, Kemp selected the 150 students scoring highest on the Rokeach Dogmatism Scale and the 150 students scoring lowest. They had all written a test on critical thinking. Those low in dogmatism, Kemp concluded, were significantly superior in critical thinking to those high in dogmatism.

Another investigation by Kemp invites comparison with classroom teaching. The influence of dogmatism on the training of counselors was examined (Kemp, 1962). He found that graduate psychology students high in dogmatism had fewer "understanding" and "supportive" responses on a test of counselor attitudes than those with an open belief-disbelief system. In addition, it was found that in actual counseling situations, the group high in dogmatism emitted, to a significant degree,

even fewer "understanding" and "supportive" responses than they had indicated they would on the hypothetical test. The open-minded students exhibited no response changes from the hypothetical to the actual situation. These findings applied whether the subjects had taken part in a counseling practicum or not.

Kemp's "understanding" and "supportive" responses seem very similar to Flanders' "indirect" responses. By transposing Kemp's findings from student counselors to student teachers, it could be suggested that closed-minded student teachers would display less indirect teaching behavior than open-minded student teachers. As well, the type of training received would not be a factor.

The work of Hough and Amidon (1965) supports the above implication. They administered the Dogmatism Scale to two groups of student teachers. Both groups wrote the Teaching Situation Reaction Test before and after student teaching; only one group received instruction in Interaction Analysis concurrently with its student teaching. "In general this test measures the student teacher's reaction to a classroom situation in terms of the direct-indirect dichotomy. A student teacher with a low score sees himself reacting fairly indirectly to a classroom situation, while a high score indicates a more direct reaction" (Amidon, n.d., p.8). One conclusion summarizes their findings. Open-minded student teachers who learned Interaction Analysis showed significantly greater change in attitudes toward the use of indirect teaching behavior

than either equally open-minded student teachers who had not learned Interaction Analysis or closed-minded student teachers who had learned Interaction Analysis.

This conclusion is based solely on responses to the T.S.R.T. It was not discovered if the student teachers actually taught as they had indicated they would on the T.S.R.T.

Zahn (1965) employed a design similar to Hough and Amidon's; however, he also administered the T.S.R.T. to the co-operating teachers. After he supervised the student teachers that had been taught Interaction Analysis, he analyzed their lessons, in consultation with them, according to Interaction Analysis. The following results emerged from the study:

(1) Student teachers undergoing instruction and supervision using Interaction Analysis had more positive teaching attitudes as measured by the T.S.R.T. after student teaching than had those students not so instructed and supervised.

(2) Student teachers undergoing instruction and supervision using Interaction Analysis tended to modify their teaching attitudes positively towards the use of indirect patterns of behavior regardless of the attitude of the co-operating teacher.

(3) Student teachers with Dogmatism Scale scores that were above average but not more than one standard deviation above the mean tended to change their attitudes positively if they experienced instruction and supervision, using Interaction

Analysis; those more than one standard deviation above the mean did not.

Zahn's study indicates that the degree of closed-mindedness might be a factor in behavioral change following instruction in Interaction Analysis. Again, however, the actual method of teaching was not a factor in the study.

V. RELATION OF REVIEWED RESEARCH TO THE PRESENT STUDY

Research studies reviewed in this chapter provide support for the suspicion that open-minded student teachers will teach more indirectly than will closed-minded student teachers after training in Interaction Analysis.

Early studies of teacher behavior were reviewed in order to show the rationale behind Flanders' method. By looking at research concerning indirect and direct teaching, the implications of indirect and direct verbal teaching behavior are illustrated. Studies concerning the training of student teachers in Interaction Analysis reveal that student teachers do teach more indirectly after receiving instruction in Interaction Analysis. The work by Rokeach provides a rationale for thinking that the strength of a person's belief-disbelief system will be a factor in his classroom verbal behavior as a teacher, whether he has been instructed in Interaction Analysis or not. Studies correlating dogmatism and student teacher attitudes present more evidence that there will be a difference in classroom verbal behavior between open-minded

and closed-minded student teachers. They stop short, however, of actually analyzing what this study intends to analyze-- actual classroom verbal behavior. The present study is different from previous studies in that it gathers empirical evidence concerning open- and closed-minded student teachers and their classroom verbal teaching behaviors.

CHAPTER III

METHOD OF INVESTIGATION OF THE PROBLEM

This chapter contains a description of the instrumentation and of the subjects. The procedure for collecting the data is explained and the method of data analysis is outlined.

I. INSTRUMENTATION

The Dogmatism Scale. The Rokeach Dogmatism Scale, Form E, was used to classify the subjects of this study as open-minded or closed-minded. A copy of this scale can be found in Appendix A. This forty-item questionnaire has gone through five revisions. A high score on the questionnaire indicates closed-mindedness; a low score indicates open-mindedness.

Rokeach found the Dogmatism Scale to be a valid measure of authoritarianism, opinionation, and religious and political commitment (Rokeach, 1956, pp.37-38). After testing English workers, English college students, and American college students, he reported reliabilities of 0.68 to 0.93. A reliability of 0.71 was obtained by a test-retest method with five to six months between tests (Rokeach, 1960, p.90). In 1965, Hough reported a corrected split-half reliability of 0.86 (Hough and Ober, 1967, p.334).

The Flanders Method of Interaction Analysis. There are ten categories in Flanders' system. Seven are assigned to teacher talk and two to student talk. The tenth category covers pauses and short periods of silence or confusion. The category system is outlined in Table 1.

This method requires an observer to note at least every three seconds, the category number of the verbal behavior he has just observed. These numbers are recorded in sequence in a column. Approximately twenty to twenty-five numbers per minute are written, for if more than one category occurs in a three-second interval, the observer may wish to note this. For purposes of analysis, the tabulations are then placed on a ten-by-ten matrix in such a way that the sequence of interaction is preserved.¹

The tabulations in the matrix represent pairs of numbers. The particular matrix cell in which tabulation of the pair of numbers is made is determined by using the first number of the pair to indicate the row and the second number of the pair for the column. The second number then becomes the first number for the next cell. Column totals indicate the percentage of each category of classroom interaction. Inserting a 10 at the beginning and end of each observation permits the total of each column to equal the total of the corresponding row.

¹Further information concerning using and interpreting Interaction Analysis can be found in The Role of the Teacher in the Classroom, by Amidon and Flanders (Minneapolis: Association for Productive Teaching, 1967), pp.31 et seq.

TABLE I

FLANDERS' CATEGORIES FOR INTERACTION ANALYSIS

TEACHER TALK	INDIRECT INFLUENCE	1.* <u>ACCEPTS FEELING</u> : accepts and clarifies the feeling tone of the students in a non-threatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.
		2.* <u>PRAISES OR ENCOURAGES</u> : praises or encourages student action or behavior. Jokes that release tension, but not at the expense of another individual; nodding head, or saying "um hm?" or "go on" are included.
		3.* <u>ACCEPTS OR USES IDEAS OF STUDENTS</u> : clarifying, building, or developing ideas suggested by a student. As teacher brings more of his own ideas into play, shift to category five.
		4.* <u>ASKS QUESTIONS</u> : asking a question about content or procedure with the intent that a student answer.
TEACHER TALK	DIRECT INFLUENCE	5.* <u>LECTURING</u> : giving facts or opinions about content or procedures; expressing his own ideas, asking rhetorical questions.
		6.* <u>GIVING DIRECTIONS</u> : directions, commands, or orders to which a student is expected to comply.
		7.* <u>CRITICIZING OR JUSTIFYING AUTHORITY</u> : statements intended to change student behavior from non-acceptable to acceptable pattern; bawling someone out; stating why the teacher is doing what he is doing; extreme self-reference.
STUDENT TALK		8.* <u>STUDENT TALK--RESPONSE</u> : talk by students in response to teacher. Teacher initiates the contact or solicits student statement.
		9.* <u>STUDENT TALK--INITIATION</u> : talk by students which they initiate. If "calling on" student is only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.
		10.* <u>SILENCE OR CONFUSION</u> : pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

* There is NO scale implied by these numbers. Each number is classificatory, it designates a particular kind of communication event. To write these numbers down during observation is to enumerate, not to judge a position on a scale.

II. DESCRIPTION AND SELECTION OF SUBJECTS

The subjects of this study were nineteen education students from the University of Alberta, who received instruction in the Flanders method of Interaction Analysis prior to their student teaching experiences. Ten were classified as closed-minded and nine were classified as open-minded, according to the Dogmatism Scale. There were originally ten open-minded students, but one withdrew from student teaching before he was observed.

Instruction took place one night a week for six weeks. The total instruction time was approximately fifteen hours. The objectives of the instruction were as follows: to enable the students to tally short lessons using the Flanders system; to enable them to place the tabulations on a matrix; to make possible interpretation of basic interaction patterns from the matrix; and to enable them to construct lesson plans using selected interaction patterns. It was hoped that the students would be aware of the implications of their verbal behavior while they were student teaching.

Before the Interaction Analysis training began, ninety-two students wrote the Rokeach Dogmatism Scale. The mean test score for this group was 143.10 and the standard deviation was 23.68. The thirty-four highest scoring students and the thirty-four lowest scoring students were then selected for instruction. Each of the sixty-eight students was randomly placed into one of two groups so that each group contained seventeen closed-minded and seventeen open-minded students.

One of these groups formed the population from which ten open-minded and ten closed-minded students were randomly selected to be subjects for this study. The group was taught Interaction Analysis and the students were required to synthesize Flanders' theories. The seventeen open-minded students in this group had a mean Dogmatism score of 119.47 with a standard deviation of 14.67. The mean of the seventeen closed-minded students was 166.24 with a standard deviation of 12.32.

III. METHOD OF CLASSROOM OBSERVATION

The subjects were observed during their second round of student teaching while leading discussions in grade seven, eight, or nine social studies classes. They had been instructed to lead discussion lessons in order to create a uniform situation and to provide a variety of verbal interaction for the observations.

Due to the co-operation and aid of the Division of Field Experiences at the University of Alberta, the researcher was able to assign the subjects to Edmonton junior high schools of his choice. This placement enabled the researcher to ensure that no observations took place in a school serving students from either a very high or a very low socio-economic area. In order to have homogeneous conditions for each observation, the classes taught by the subjects contained students from similar, middle-class socio-economic areas, and these classes were designated as average in ability by the co-operating teachers.

The first week of the student teaching session was allotted for the student teachers to familiarize themselves with their students. All the observations took place during the next four weeks.

Each subject was asked to conduct two discussion lessons for the observer. The subjects were allowed to define a discussion themselves. No restrictions were made regarding content or method. Whenever a student teacher designated a lesson as a discussion lesson, he was observed by the researcher. This design did not allow any order in the observations of the nineteen subjects. It was made certain, nevertheless, that no two observations of the same subject occurred on the same day; as many days as possible separated observations. Many of the student teachers were observed teaching two different classes.

They were each observed for two, twenty-minute periods by a trained observer using Flanders' Interaction Analysis.² Before each observation the observer listened to the interaction for approximately five minutes, becoming orientated to the classroom atmosphere. The subjects were told that the observer was not evaluating them as he observed. They knew the observations were for a research study, and they had consented to being studied.

²On three occasions, two observers were present.

IV. OBSERVER RELIABILITY

The researcher, who observed all lessons, and a second person, who observed three lessons, trained themselves to tally classroom interaction according to Flanders' method. A variety of self-instruction tapes were used. Before a satisfactory level of performance was obtained, approximately thirty hours of practice were necessary.

Observer reliability was determined by comparing completed interaction matrices, using Scott's coefficient. Flanders (1967, p.166) states that a Scott coefficient of 0.85 or higher is a reasonable level of performance.

Scott calls his coefficient " π ", and it is determined by the two formulas below:

$$\text{Formula I: } \pi = \frac{P_o - P_e}{1 - P_e}$$

P_o is the proportion of agreement, and P_e is the proportion of agreement expected by chance, which is found by squaring the proportion of tallies in each category and summing these over all categories:

$$\text{Formula II: } P_e = \sum_{i=1}^k P_i^2$$

In Formula II there are k categories and P_i is the proportion of tallies falling into each category. π , in Formula I, can be expressed in words as the amount by which the tallies of two observers exceeded chance agreement, divided by the amount by which perfect agreement exceeds chance (Flanders, 1965, pp.25-26).

The researcher obtained reliability coefficients of 0.95 and 0.91 when he compared his tallying of keyed, taped lessons to the keys. By the same procedure, the second observer obtained reliability coefficients of 0.38 and 0.37. When the observers' tabulations were compared, coefficients of observer agreement were found to be 0.88 and 0.86.

The consistency of the researcher over the time of the classroom observations was checked by the researcher tallying a taped lesson twice, once at the beginning of the observations and again two weeks later. A stability coefficient of 0.95 was obtained when the two tabulations were compared.

On three occasions on two different days, the second observer tallied subjects with the researcher. This was to guard against any bias occurring in the tallying by the researcher. He knew which subjects were classified as open-minded and which subjects were classified as closed-minded; the second observer did not. Coefficients of observer agreement on these occasions were 0.90, 0.93, and 0.87.³

V. METHOD OF DATA ANALYSIS

The two observations for each subject were tabulated on one matrix; tabulations were converted to percentage figures.⁴ Composite percentage matrices for both groups were next calculated. These composite matrices were used to analyze the differences in verbal behavior between the open-minded and closed-minded groups.

The t-test was used to test each hypothesis. All of the hypotheses were tested at the .05 level of significance.

For purposes of statistical analysis, the hypotheses were stated in the null form. The following tested differences between the group of open-minded student teachers and the group

³See Appendix B for tests of observer reliability, stability, and agreement.

⁴See Appendix C for individual percentage matrices.

of closed-minded student teachers.

Null Hypothesis 1: There will be no difference between the open- and closed-minded groups in percentages of teacher talk.

Null Hypothesis 2: There will be no difference between the open- and closed-minded groups in percentages of student talk.

Null Hypothesis 3: There will be no difference between the open- and closed-minded groups in I/D ratios.

Null Hypothesis 4: There will be no difference between the open- and closed-minded groups in i/d ratios.

Null Hypothesis 5: There will be no difference between the open- and closed-minded groups in percentages of acceptance and clarification of student feeling.

Null Hypothesis 6a: There will be no difference between the open- and closed-minded groups in percentages of praise or encouragement by the teacher.

Null Hypothesis 6b: There will be no difference between the open- and closed-minded groups in percentages of extended praise or encouragement by the teacher.

Null Hypothesis 6c: There will be no difference between the open- and closed-minded groups in percentages of praise or encouragement by the teacher after student-

initiated ideas.

Null Hypothesis 7a: There will be no difference between the open- and closed-minded groups in percentages of acceptance or use of student ideas.

Null Hypothesis 7b: There will be no difference between the open- and closed-minded groups in percentages of extended acceptance or use of student ideas.

Null Hypothesis 8a: There will be no difference between the open- and closed-minded groups in percentages of teacher questioning.

Null Hypothesis 8b: There will be no difference between the open- and closed-minded groups in percentages of extended teacher questioning.

Null Hypothesis 9a: There will be no difference between the open- and closed-minded groups in percentages of teacher lecturing.

Null Hypothesis 9b: There will be no difference between the open- and closed-minded groups in percentages of extended teacher lecturing.

Null Hypothesis 10: There will be no difference between the open- and closed-minded groups in percentages of teacher direction giving.

Null Hypothesis 11: There will be no difference between the open- and closed-minded groups in percentages of teacher criticism or justification of authority.

Null Hypothesis 12a: There will be no difference between the open- and closed-minded groups in percentages of student talk in response to the teacher.

Null Hypothesis 12b: There will be no difference between the open- and closed-minded groups in percentages of extended student talk in response to the teacher.

Null Hypothesis 13a: There will be no difference between the open- and closed-minded groups in percentages of student-initiated talk.

Null Hypothesis 13b: There will be no difference between the open- and closed-minded groups in percentages of extended student-initiated talk.

Null Hypothesis 14: There will be no difference between the open- and closed-minded groups in percentages of silence or confusion in the classes.

CHAPTER IV

RESULTS OF THE INVESTIGATION

In this chapter the results of the analysis are reported and presented in order. Each hypothesis is reviewed, and data used to test the hypothesis are presented with reference to the appropriate tables. A summary of results concludes the chapter.

I. HYPOTHESES' TEST RESULTS

Hypothesis 1. Null hypothesis 1 was accepted, ($p=.251$). The hypothesis--there will be a smaller percentage of teacher talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. Both groups of student teachers used about the same percentage of class time for teacher talk. The results of the analysis are shown in Table II, page 45.

Hypothesis 2. Null hypothesis 2 was accepted, ($p=.217$). The hypothesis--there will be a greater percentage of student talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. The percentage of student talk in the classes of open and closed-minded student teachers was approximately equal for both groups. The results of the analysis are shown in Table II, page 45.

Hypothesis 3. Null hypothesis 3 was rejected at the .01 level of confidence. The hypothesis--open-minded student teachers will have a larger index of indirect-direct teaching behavior as classified by the I/D ratio than the closed-minded student teachers will--was therefore accepted. Open-minded student teachers had a significantly larger I/D ratio than closed-minded student teachers. The results of the analysis are shown in Table II.

Hypothesis 4. Null hypothesis 4 was rejected at the .01 level of confidence. The hypothesis--open-minded student teachers will have a larger index of indirect-direct teaching behavior as classified by the i/d ratio than the closed-minded student teachers will--was therefore accepted. Open-minded student teachers taught significantly more indirectly as measured by the i/d ratio than did closed-minded student teachers. The results of the analysis are shown in Table II.

Hypothesis 5. Null hypothesis 5 was accepted ($p=.051$). The hypothesis--a larger percentage of class time will be categorized as acceptance and clarification of student feeling in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. Open-minded student teachers did accept and clarify student feeling more than closed-minded student teachers. The difference approached significance but the .05 level of confidence was not reached. The results of the analysis are shown in Table III.

TABLE II

RESULTS OF THE ANALYSES FOR HYPOTHESES ONE TO FOUR

	Open- minded Student Teachers ($n_1=9$)		Closed- minded Student Teachers ($n_2=10$)		t	p*
	\bar{X}	S.D.	\bar{X}	S.D.		
Percentage of Teacher Talk	48.65	7.83	51.75	10.44	0.69	.251
Percentage of Student Talk	42.72	6.79	39.19	10.71	0.80	.217
I/D Ratio	0.70	0.07	0.54	0.13	3.04	.003**
i/d Ratio	0.97	0.02	0.78	0.14	3.62	.001**

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

TABLE III

RESULTS FOR THE ANALYSIS OF HYPOTHESIS FIVE

	Open- minded Student Teachers ($n_1=9$)		Closed- minded Student Teachers ($n_2=10$)		t	p*
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #1	0.21	0.23	0.06	0.11	1.73	.051

* With 17 d.f.

Hypothesis 6a. Null hypothesis 6a was accepted ($p=.070$). The hypothesis--there will be no difference in the percentage of class time categorized as praise or encouragement by the teacher between the classes of the open-minded student teachers and the classes of the closed-minded student teachers--was therefore accepted. Open-minded student teachers used more praise or encouragement in their classes than closed-minded student teachers did, but the difference was not significant at the .05 level of confidence. The results of the analysis are shown in Table IV.

Hypothesis 6b. Null hypothesis 6b was accepted ($p=.231$). The hypothesis--a larger percentage of class time will be categorized as extended praise or encouragement over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. There was no significant difference in the amount of extended praise or encouragement used by open- and closed-minded student teachers. The results of the analysis are shown in Table IV.

Hypothesis 6c. Null hypothesis 6c was rejected at the .05 level of confidence. The hypothesis--a larger percentage of class time will be categorized as praise or encouragement of a student-initiated idea in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore accepted. Open-minded student teachers praised or encouraged student ideas significantly

more often than closed-minded student teachers did. The results of the analysis are shown in Table IV.

TABLE IV

RESULTS OF THE ANALYSES FOR HYPOTHESES SIX A, SIX B, AND SIX C

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p^*
	\bar{X}	S.D.	\bar{X}	S.D.		
Category 2	9.12	3.85	6.81	2.16	1.54	.070
2-2 Cell	0.32	0.30	0.21	0.27	0.75	.231
9-2 Cell	3.35	2.10	1.52	0.92	2.37	.015**

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

Hypothesis 7a. Null hypothesis 7a was rejected at the .01 level of confidence. The hypothesis--a larger percentage of class time will be categorized as acceptance or use of student ideas in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore accepted. Open-minded student teachers accepted or used student ideas significantly more often than closed-minded student teachers did. The results of the analysis are shown in Table V.

Hypothesis 7b. Null hypothesis 7b was rejected at the .01 level of confidence. The hypothesis--a larger percentage

of class time will be categorized as extended acceptance or use of student ideas over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore accepted. Open-minded student teachers extended their acceptance and use of student ideas significantly more often than did closed-minded student teachers. The results of the analysis are shown in Table V.

TABLE V

RESULTS OF THE ANALYSES FOR HYPOTHESES SEVEN A AND SEVEN B

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #3	9.65	2.32	4.64	2.05	4.72	.001 ^{**}
3-3 Cell	2.22	0.91	0.72	0.55	4.17	.001 ^{**}

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

Hypothesis 8a. Null hypothesis 8a was accepted ($p=.340$).

The hypothesis--there will be no difference in the percentage of class time categorized as teacher questioning between the classes of the open-minded student teachers and the classes of the closed-minded student teachers--was therefore accepted. Each group of student teachers spent approximately the same amount of time asking questions. The results of the analysis are shown in Table VI.

Hypothesis 8b. Null hypothesis 8b was accepted ($p=.459$). The hypothesis--a larger percentage of class time will be categorized as extended teacher questioning over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. Each group of student teachers used about four per cent of classroom time for extended questioning. The results of the analysis are shown in Table VI.

TABLE VI

RESULTS OF THE ANALYSES FOR HYPOTHESES EIGHT A AND EIGHT B

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p*
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #4	14.88	2.65	15.78	5.55	0.42	.340
4-4 Cell	4.14	1.16	4.02	3.14	0.10	.459

* With 17 d.f.

Hypothesis 9a. Null hypothesis 9a was rejected at the .05 level of confidence. The hypothesis--there will be no difference in the percentage of class time categorized as teacher lecturing between the classes of the open-minded student teachers and the classes of the closed-minded student teachers--was therefore rejected. Closed-minded student teachers used a significantly greater amount of class time to

lecture than open-minded student teachers did. The results of the analysis are shown in Table VII.

Hypothesis 9b. Null hypothesis 9b was accepted ($p=.058$). The hypothesis--a larger percentage of class time will be categorized as extended lecturing in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore rejected. Closed-minded student teachers however, did appear to make more use of extended lecturing than open-minded student teachers did. The difference in the percentage of extended lecturing approached significance, but did not reach the .05 level of confidence. The results of the analysis are shown in Table VII.

TABLE VII

RESULTS OF THE ANALYSES FOR HYPOTHESES NINE A AND NINE B

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p^*
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #5	14.11	4.51	20.71	8.94	1.89	.038**
5-5 Cell	8.65	3.36	13.56	7.80	1.65	.058

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

Hypothesis 10. Null hypothesis 10 was rejected at the .01 level of confidence. The hypothesis--a larger percentage of class time will be categorized as teacher giving directions in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore accepted. Closed-minded student teachers gave significantly more directions than open-minded ones gave. The results of the analysis are shown in Table VIII.

Hypothesis 11. Null hypothesis 11 was rejected at the .05 level of confidence. The hypothesis--a larger percentage of class time will be categorized as criticism or justification of authority by the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore accepted. Closed-minded student teachers criticized or justified their authority significantly more often than open-minded student teachers did. The results of the analysis are shown in Table VIII.

TABLE VIII

RESULTS OF THE ANALYSES FOR HYPOTHESES TEN AND ELEVEN

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #6	0.44	0.32	1.72	1.25	2.81	.005 ^{**}
Category #7	0.24	0.34	2.03	2.38	2.11	.025 ^{**}

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

Hypothesis 12a. Null hypothesis 12a was rejected at the .05 level of confidence. The hypothesis--a larger percentage of class time will be categorized as student talk in response to the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore accepted. There was significantly more student talk in response to the teacher in the classes of the closed-minded group than in the classes of the open-minded group. The results of the analysis are shown in Table IX.

Hypothesis 12b. Null hypothesis 12b was rejected at the .05 level of confidence. The hypothesis--a larger percentage of class time will be categorized as student talk extended over three seconds in response to the teacher in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore accepted. There was significantly more extended student talk in response to the teacher in the classes of the closed-minded group than in the classes of the open-minded group. The results of the analysis are shown in Table IX.

Hypothesis 13a. Null hypothesis 13a was accepted ($p=.066$). The hypothesis--a larger percentage of class time will be categorized as student-initiated talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. There was more student-initiated talk in the classes of the open-minded

student teachers than in the classes of the closed-minded student teachers. The difference approached significance but the .05 level of confidence was not reached. The results of the analysis are shown in Table X.

TABLE IX

RESULTS OF THE ANALYSES FOR HYPOTHESES TWELVE A AND TWELVE B

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category 8	14.12	5.42	19.46	5.64	1.98	.032**
8-8 Cell	3.67	2.52	6.95	2.73	2.57	.010**

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

Hypothesis 13b. Null hypothesis 13b was accepted ($p=.091$). The hypothesis--a larger percentage of class time will be categorized as student-initiated talk extended over three seconds in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers--was therefore rejected. There was more extended student-initiated talk in the classes of the open-minded student teachers than in the classes of the closed-minded student teachers, but the difference was not significant at the .05 level of confidence. The results of the analysis are shown in Table X.

TABLE X

RESULTS OF THE ANALYSES FOR HYPOTHESES THIRTEEN A AND THIRTEEN B

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category 9	28.60	11.71	19.74	11.34	1.58	.066
9-9 Cell	19.19	9.47	12.84	9.34	1.39	.091

* With 17 d.f.

Hypothesis 14. Null hypothesis 14 was accepted ($p=.415$). The hypothesis--a larger percentage of class time will be categorized as silence or confusion in the classes of the closed-minded student teachers than in the classes of the open-minded student teachers--was therefore rejected. There was approximately an equal percentage of silence or confusion in the classes of both groups. The results of the analysis are shown in Table XI.

TABLE XI

RESULTS OF THE ANALYSIS FOR HYPOTHESIS FOURTEEN

	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #10	8.63	4.94	9.06	3.06	0.22	.415

* With 17 d.f.

II. SUMMARY OF RESULTS

Eleven of the twenty-one hypotheses were accepted. Six of these eleven were within the .01 level of confidence. Four of the rejected hypotheses were within the .10 level of confidence and thus were close to acceptance. One hypothesis --percentage of lecturing--yielded a significant difference between groups when none had been predicted. Explanations for the rejected hypotheses are contained in the next chapter.

A comparison between the two groups of student teachers with respect to the percentage of verbal responses in each of the ten categories is summarized in Table XII. The means, standard deviations and t-ratios for the analyses are given. Significant differences between the verbal behavior of the two groups were found in categories 3, 5, 6, 7, and 8. The open-minded group had a significantly greater percentage of tallies in category 3, and a significantly smaller percentage of tallies in categories 5, 6, 7, and 8 than did the closed-minded group.

Table XII compares the two groups on the basis of the remaining aspects of classroom verbal behavior reported in this chapter. The means, standard deviations and t-ratios for the analyses are given. The open-minded group had significantly greater I/D and i/d ratios than did the closed-minded group. The open-minded group also had a significantly greater percentage of tallies in the 9-2 and 3-3 cells, and a significantly smaller percentage of tallies in the 8-8 cell than did the closed-minded group.

TABLE XII

A COMPARISON OF OPEN-MINDED AND CLOSED-MINDED
STUDENT TEACHERS ON PERCENTAGES OF
CLASSROOM VERBAL BEHAVIOR

Category of Verbal Behavior	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
Category #1	0.21	0.23	0.06	0.11	1.73	.051
Category #2	9.12	3.85	6.81	2.16	1.54	.070
Category #3	9.65	2.32	4.64	2.05	4.72	.001 ^{**}
Category #4	14.88	2.65	15.78	5.55	0.42	.340
Category #5	14.11	4.51	20.71	8.94	1.89	.038 ^{**}
Category #6	0.44	0.32	1.72	1.25	2.81	.005 ^{**}
Category #7	0.24	0.34	2.03	2.38	2.11	.025 ^{**}
Category #8	14.12	5.42	19.46	5.64	1.98	.032 ^{**}
Category #9	28.60	11.71	19.74	11.34	1.58	.066
Category #10	8.63	4.94	9.06	3.06	0.22	.415

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

TABLE XIII

A COMPARISON OF OPEN-MINDED AND CLOSED-MINDED
STUDENT TEACHERS ON SELECTED ASPECTS
OF CLASSROOM VERBAL BEHAVIOR

Aspect of Verbal Behavior	Open-minded Student Teachers ($n_1=9$)		Closed-minded Student Teachers ($n_2=10$)		t	p [*]
	\bar{X}	S.D.	\bar{X}	S.D.		
% of Teacher Talk	48.65	7.83	51.75	10.44	0.69	.251
% of Student Talk	42.72	6.79	39.19	10.71	0.80	.217
I/D Ratio	0.70	0.07	0.54	0.13	3.04	.003 ^{**}
i/d Ratio	0.97	0.02	0.78	0.14	3.62	.001 ^{**}
2-2 Cell	0.32	0.30	0.21	0.27	0.75	.231
9-2 Cell	3.35	2.10	1.52	0.92	2.37	.015 ^{**}
3-3 Cell	2.22	0.91	0.72	0.55	4.17	.001 ^{**}
4-4 Cell	4.14	1.16	4.02	3.14	0.10	.459
5-5 Cell	8.65	3.36	13.56	7.80	1.65	.058
8-8 Cell	3.67	2.52	6.95	2.73	2.57	.010 ^{**}
9-9 Cell	19.19	9.47	12.84	9.34	1.39	.091

* With 17 d.f.

** Significant beyond the .05 level (one-tailed)

CHAPTER V

INTERPRETATION AND CONCLUSIONS

I. INTERPRETATION

General Findings

The researcher associated closed-mindedness with direct teaching and open-mindedness with indirect teaching. As direct teaching had been correlated with high percentages of teacher talk, and indirect teaching had been correlated with high percentages of student talk (Flanders, 1965; Kirk, 1965; Lohman, 1966), it is at first surprising that no significant differences were found between open- and closed-minded subjects regarding the total percentages of teacher talk and student talk during their classes. Then it was realized that most research had not been carried out solely while social studies discussions were being conducted. The research had encompassed all types of lessons; thus, the findings were applicable to teaching in general, not to specific styles of teaching.

It is believed that instructing all subjects to conduct discussion lessons explains the lack of significant differences in the amounts of teacher talk and student talk found in the classes of the two groups. It is postulated that there was less teacher talk and more student talk in the classes of the closed-minded subjects than past research has indicated there normally is, due to the nature of the lessons being conducted.

This belief is supported by research carried out by Moskowitz (1966).¹ She observed discussion lessons in secondary schools and she reported that there were no significant differences in the amounts of teacher talk and student talk between the classes of teachers trained in Interaction Analysis and the classes of teachers not so trained. However, just as the present study found, she did report significant differences between groups when the indirect-direct teaching ratios were compared.

Returning to the present study, in each group approximately fifty per cent of the class time was occupied by the teacher talking, and approximately forty per cent by the students talking. Although the total amounts of talk were similar, significant differences were found when types of teacher and student verbal behavior were compared.

Figure 1 illustrates graphically how the classroom interaction patterns of open- and closed-minded student teachers differed when the percentages of verbal responses in each of Flanders' categories were compared. In cases where the percentage of tallies was relatively small, categories of similar behavior were combined.

The mean I/D ratio for the open-minded student teachers was 0.70, but it was only 0.54 for the closed-minded student teachers. The mean i/d ratio for the open-minded student teachers was 0.97, but it was only 0.78 for the closed-minded

¹Cf., p. 24.

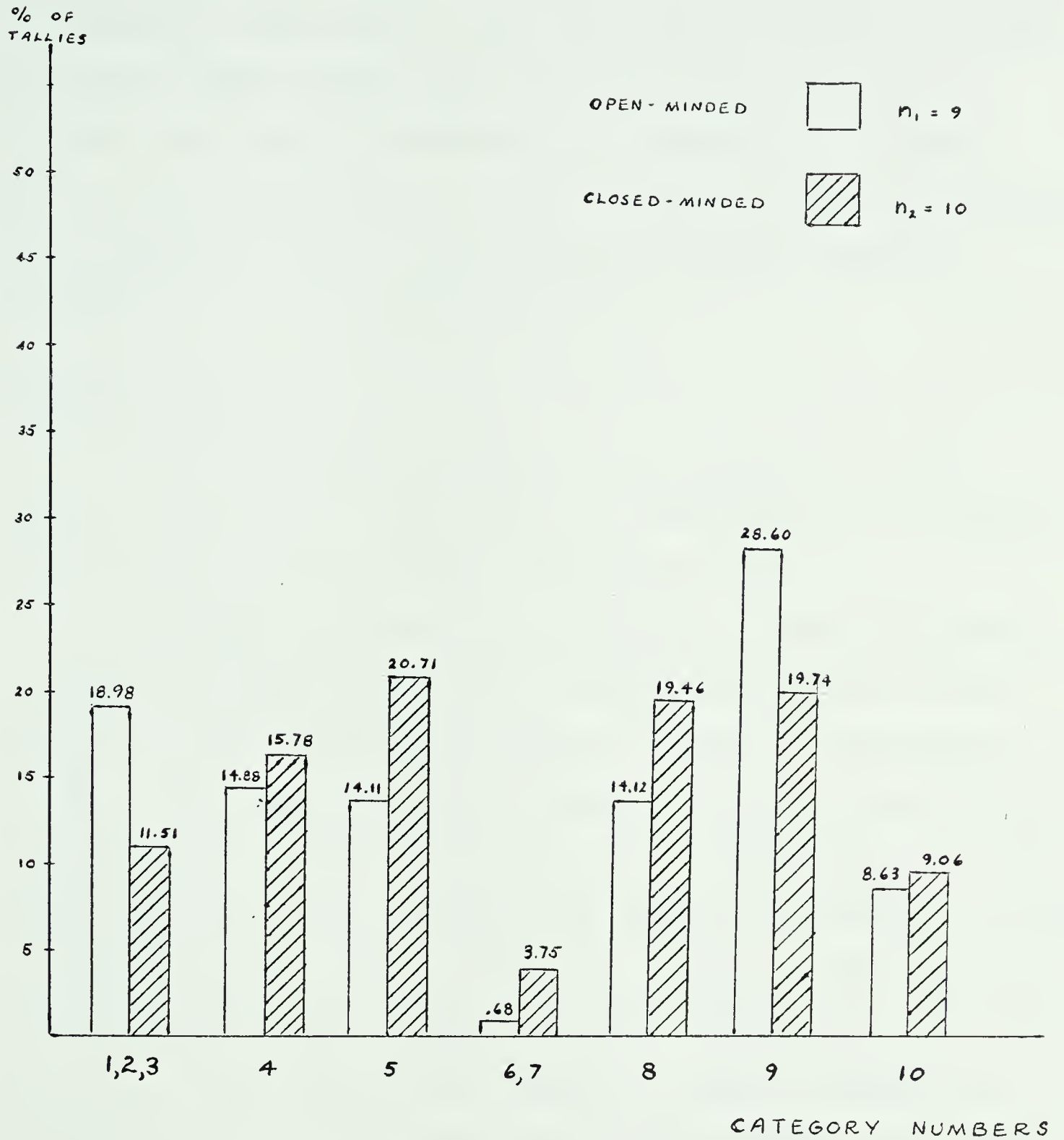


FIGURE 1

CLASSROOM INTERACTION PATTERNS OF OPEN-MINDED
 AND CLOSED-MINDED STUDENT TEACHERS WHILE
 CONDUCTING DISCUSSION LESSONS

student teachers. Both differences were significant at the .01 level of confidence. This means that although the amount of teacher talk was the same for each group, the type of teacher talk was quite different in each group. As hypothesized, the open-minded student teachers taught significantly more indirectly than the closed-minded student teachers according to the I/D and i/d ratios.

Specific Findings

A more detailed analysis of the classroom verbal behavior was made by considering the percentage of tallies in each category and in certain individual cells.

In order to facilitate comparison of the two groups, a composite matrix showing the average percentage of total tallies for the open-minded student teachers is presented in Table XIV. In like manner, Table XV, page 63, shows the composite matrix for the closed-minded student teachers. The total of each column indicates the average percentage of tallies recorded for that category, and is a measure of the percentage of time a particular category is used. Tallies in cells 1-1, 2-2, 3-3, etc., indicate the number of times a category is sustained for a period longer than three seconds. All other cells indicate transitional behavior, that is, the number of times the verbal discourse changed from one category to another. The tallies in cell 9-2, for example, represent the number of times a category 9 was followed by category 2.

TABLE XIV

COMPOSITE PERCENTAGE MATRIX OF THE NINE
OPEN-MINDED STUDENT TEACHERS

Category	1	2	3	4	5	6	7	8	9	10
1	0.03	0.00	0.03	0.01	0.07	0.00	0.00	0.01	0.05	0.00
2	0.01	0.32	2.18	2.20	1.07	0.03	0.03	1.05	1.59	0.65
3	0.00	0.33	2.22	1.43	1.15	0.00	0.00	1.85	2.17	0.50
4	0.00	0.07	0.07	4.14	0.48	0.04	0.00	5.66	1.86	2.56
5	0.04	0.10	0.04	2.65	8.65	0.06	0.00	0.40	1.48	0.71
6	0.00	0.00	0.00	0.06	0.03	0.03	0.00	0.15	0.08	0.10
7	0.00	0.00	0.00	0.06	0.01	0.01	0.04	0.04	0.04	0.03
8	0.04	4.76	2.20	1.19	0.49	0.10	0.08	3.67	0.98	0.60
9	0.07	3.35	2.66	1.05	1.37	0.06	0.06	0.04	19.19	0.76
10	0.01	0.18	0.25	2.09	0.82	0.11	0.03	1.26	1.15	2.74
Total	0.21	9.12	9.65	14.88	14.11	0.44	0.24	14.12	28.60	8.63

TABLE XV

COMPOSITE PERCENTAGE MATRIX OF THE TEN
CLOSED-MINDED STUDENT TEACHERS

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.01	0.04	0.00	0.00	0.00	0.00	0.01	0.00
2	0.00	0.21	0.98	1.81	1.57	0.04	0.03	0.76	0.92	0.50
3	0.01	0.09	0.73	0.76	0.72	0.04	0.05	1.23	0.71	0.27
4	0.00	0.07	0.03	4.02	0.66	0.10	0.14	7.12	1.16	2.46
5	0.01	0.05	0.04	3.07	13.55	0.41	0.14	0.76	1.45	1.22
6	0.00	0.03	0.01	0.11	0.24	0.17	0.05	0.57	0.35	0.20
7	0.00	0.00	0.01	0.26	0.14	0.15	0.41	0.31	0.44	0.35
8	0.01	4.57	1.79	2.40	1.06	0.35	0.38	6.95	0.97	1.01
9	0.03	1.52	0.98	1.20	1.60	0.20	0.41	0.10	12.84	0.88
10	0.00	0.26	0.10	2.11	1.18	0.24	0.42	1.66	0.94	2.14
Total	0.06	6.81	4.64	15.78	20.71	1.72	2.03	19.46	19.74	9.06

Category 1. Due to the extremely small use of category 1--acceptance of feeling--by both groups, no significant difference occurred although one had been hypothesized. However, this category was used over three times as often by the open-minded group as by the closed-minded group. As well, five of the nine open-minded student teachers, but only three of the ten closed-minded student teachers used this category. Infrequent use of category 1 was reported by Flanders (1965), and Amidon and Giammatteo (1965). It would appear that this category is usually used very infrequently, but that it is a characteristic of indirect teaching.

Category 2. As hypothesized, no significant difference occurred in the use of category 2--praise or encouragement. Not hypothesized was the lack of a significant difference in the use of extended praise, shown in the 2-2 cell. Individuals varied widely from the mean in use of this cell. This probably was the reason for the lack of a significant difference between the two groups. There was a tendency toward more use of praise and extended praise by the open-minded group than by the closed-minded group.

The difference in the amount of praise used is accounted for in the 9-2 cell--praise of a student-initiated idea. As hypothesized, a significant difference was found. Over twice the percentage of tallies was recorded here for the open-minded student teachers as for the closed-minded student teachers. It would appear that while there was little difference in total use of praise, the open-minded student teachers were

more willing to praise and encourage student-initiated ideas than were the closed-minded student teachers.

Category 3. Very significant differences were found concerning the use of category 3--acceptance or use of student ideas. These differences had been hypothesized. This category was used twice as often by open-minded student teachers as by closed-minded student teachers. The percentage of tallies recorded for the open-minded student teachers in the 3-3 cell was three times that recorded for the closed-minded student teachers, indicating a more lengthy development of ideas by the former.

Use of category 3 involves expanding and clarifying student thoughts. It is of more than passing concern, therefore, that it appears that the open-minded student teachers were more able or more willing to do this than the closed-minded student teachers.

Category 4. As hypothesized, category 4--teacher questioning--was used almost as frequently by one group as by the other group. Unexpectedly, as a difference had been hypothesized, both groups asked about an equal amount of lengthy questions, shown in the 4-4 cell. This lack of significant difference between groups might again be explained by the fact that all subjects were leading discussions. Lengthy questions usually generate student participation. It is therefore suggested that all subjects believed themselves expected to ask lengthy questions in order to obtain student discussion.

It should be noted that twice as many tallies were recorded for closed-minded subjects as for open-minded subjects in the 8-4 cell--student response leading to teacher question. This datum supports an observation of the researcher that closed-minded student teachers instigated a question-answer-question-answer pattern in their classrooms more often than did open-minded student teachers. This pattern results in a large amount of student talk but does not allow for the initiation of ideas by students.

Category 5. Category 5--lecturing--was used significantly more often by the closed-minded group than by the open-minded group. No difference had been hypothesized.

No significant difference was found when use of the 5-5 cell--extended lecturing--was examined but significance was approached. A difference had been hypothesized. Extended lecturing occurred 13.56 per cent of the time in classes of the closed-minded subjects and 8.65 per cent of the time in the open-minded subjects' classes.

Use of this category illustrates the flexibility of teaching classified as indirect. When teaching has been analyzed during several situations and over extended periods of time (Flanders, 1965; Amidon and Giammatteo, 1965; Pankratz, 1965), research has revealed no difference between indirect and direct teaching with regard to the percentage of time categorized as lecturing. Yet the present study, analyzing only discussion lessons, discovered that open-minded student teachers, who taught indirectly, lectured significantly less

than closed-minded student teachers, who taught directly.² The open-minded subjects thus appear to be more flexible than the closed-minded subjects. They were able to modify their verbal behavior to a greater extent than their closed-minded counterparts in order to meet the demands of conducting a discussion lesson.

Categories 6 and 7. As hypothesized, the closed-minded group gave directions significantly more often and criticized significantly more often than the open-minded group. Closed-minded student teachers gave directions three-and-a-half times as often, and criticized or justified their authority more than eight times as often as did open-minded student teachers. These findings are indicative of the more direct approach used by the closed-minded student teachers.

Closed-minded student teachers had a tendency to state their questions in the form of a command, as was revealed by studying the 6-8 cell, a teacher directive leading to a student response. The closed-minded group had almost four times as many tallies in this cell as did the open-minded group. It is believed by the researcher that these directions or commands, along with the frequent criticism by the closed-minded student teacher, resulted in a more tense classroom climate which did not generate productive discussion.

Category 8. A result of direct teaching behavior is

²Cf., pp. 59-61.

illustrated by category 8. As hypothesized, there was a significantly greater percentage of teacher-solicited student talk in the classes of the closed-minded group than in the classes of the open-minded group. There was also, as hypothesized, a significantly greater percentage of extended talk of this type, indicated in the 8-8 cell, in the classes of the former than in the classes of the latter. For the closed-minded subjects, this type of response appears to have satisfied a criterion for student discussion. It appears not to have satisfied the open-minded subjects.

It is interesting to note that Rokeach sees a closed belief-disbelief system as a "tightly-woven network of cognitive defenses against anxiety" (Rokeach, 1960, p.69). The student teaching experience is certainly an anxiety-producing experience for most student teachers. Furthermore, conducting a discussion is one of the more difficult, and therefore more anxiety-producing tasks for any student teacher. The frequency of category 8 tallies in classes of the closed-minded group now connotes added significance when viewed in Rokeach's terms. Teacher-solicited student talk satisfies a criterion for a discussion lesson, but student talk of this nature is not as anxiety-provoking for the student teacher as student-initiated ideas might be. Soliciting category 8 responses thus becomes a defence against anxiety. It will be remembered that the closed-minded student teachers did not praise student-initiated ideas as often as open-minded student teachers. They did, however, praise student responses to their questions as often

as open-minded student teachers.

Category 9. Category 9--student initiated talk-- occurred 28.6 per cent of the time in classes of the open-minded student teachers and 19.7 per cent of the time in classes of the closed-minded student teachers. However, the difference of means for the two groups was not significant at the .05 level since the overall tendency was not consistent for all teachers. A difference had been hypothesized. The range for category 9 in the closed-minded group was from 2.5 per cent to 39.4 per cent. The range in the open-minded group was from 9.0 per cent to 40.8 per cent.

Extended student-initiated talk, shown in the 9-9 cell, occurred 19.2 per cent of the time in classes of the open-minded student teachers and 12.8 per cent of the time in classes of the closed-minded student teachers. Again, a difference had been hypothesized, but the difference of means for the two groups was not significant at the .05 level, as individuals varied widely from the mean. One of the open-minded student teachers had only 4.9 per cent of his tallies in this cell and the range for the closed-minded group was from 1.3 per cent to 28.9 per cent.

Larger samples would probably absorb individual inconsistencies and would probably result in significant differences in group means for this category.

Category 10. Category 10--silence and confusion-- appeared in nearly equal percentages for both groups. During a discussion there is likely to be less silence because students are actively participating in classroom discourse. This probably accounts for the relatively small percentage of class time categorized as silence and confusion for both groups, when a difference between groups had been hypothesized.

II. CONCLUSIONS

Data analyzed in this investigation revealed no significant differences between groups in total percentages of teacher talk and student talk. When the individual categories of teacher talk and student talk were analyzed, it was found that there were observed differences between the classroom verbal behavior of open-minded and closed-minded student teachers who had been instructed in the Flanders method of Interaction Analysis. The open-minded student teachers exhibited more indirect and less direct verbal behaviors than did the closed-minded student teachers when teaching junior high school social studies discussion lessons.

Open-minded student teachers significantly differed from closed-minded student teachers in the following aspects of classroom verbal behavior:

(1) They exhibited more indirect verbal behavior as compared with direct verbal behavior, according to the I/D ratio, than did the closed-minded student teachers.

(2) They exhibited more indirect verbal behavior as

compared with direct verbal behavior, according to the i/d ratio, than did the closed-minded student teachers.

(3) They used more praise after a student-initiated idea than did the closed-minded student teachers.

(4) They exhibited more acceptance and clarification of student talk than did the closed-minded student teachers.

(5) They exhibited more extended acceptance and clarification of student talk than did the closed-minded student teachers.

(6) They did less lecturing than did the closed-minded student teachers.

(7) They gave fewer directions than did the closed-minded student teachers.

(8) They did less criticizing than did the closed-minded student teachers.

(9) There was less student talk in response to the teacher during their classes than during the classes of the closed-minded student teachers.

(10) There was less extended student talk in response to the teacher during their classes than during the classes of the closed-minded student teachers.

Differences between open-minded and closed-minded student teachers approached significance ($p < .10$) in the following aspects of classroom verbal behavior:

(1) Open-minded student teachers did less extended lecturing than did closed-minded student teachers.

(2) Open-minded student teachers exhibited more

acceptance of student feeling than did closed-minded student teachers.

(3) There was more student-initiated talk during the classes of the open-minded student teachers than during the classes of the closed-minded student teachers.

(4) There was more extended student-initiated talk during the classes of the open-minded student teachers than during the classes of the closed-minded student teachers.

The classroom verbal behavior of open-minded student teachers was found to be similar to the classroom verbal behavior of closed-minded student teachers in the percentages of each of the following:

- (1) teacher talk
- (2) student talk
- (3) praise by the teacher
- (4) extended praise by the teacher
- (5) questioning by the teacher
- (6) extended questioning by the teacher
- (7) silence or confusion

CHAPTER VI

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

I. SUMMARY OF THE STUDY

This study investigated the possibility of a relationship between the strength of a student teacher's belief-disbelief system and his classroom verbal teaching behavior. The specific problem of this study guiding the inquiry was as follows: Do open-minded and closed-minded student teachers in secondary education who have been instructed in the Flanders method of Interaction Analysis differ in their classroom verbal behavior in teaching junior high school social studies discussion lessons?

In order to investigate the problem, nine¹ open-minded and ten closed-minded student teachers who had been identified by the Dogmatism Scale and who had received approximately fifteen hours of instruction in Interaction Analysis were randomly selected from a population of seventeen open-minded and seventeen closed-minded, pre-service education students at the University of Alberta. For their second session of student teaching, the subjects were assigned to Edmonton junior high schools that served students from middle-class socio-economic areas. They were observed during this time while leading discussion lessons in social studies. The classes in

¹Ten were selected, but one later withdrew from practice teaching.

which the observations took place had been described as classes of average academic ability.

On two separate occasions, for a total of forty minutes, each subject was observed by a trained observer using Flanders' Interaction Analysis as a tool for observation. The data thus obtained were tabulated on percentage matrices. Composite percentage matrices depicting each group's verbal interaction pattern were then used to analyze differences in verbal behavior between the open- and closed-minded groups.

Eleven of twenty-one hypotheses were accepted. Of the rejected hypotheses, four approached significance ($p < .10$); results of another revealed that the closed-minded group lectured significantly more than the open-minded group, although no difference between groups had been predicted. These results were interpreted and explained.

The findings of this investigation led to the conclusion that there were observed differences between the classroom verbal behavior of open-minded and closed-minded student teachers who had been instructed in the Flanders method of Interaction Analysis. These differences occurred even though there were no significant differences between groups in total percentages of teacher talk and student talk. The open-minded student teachers were found to exhibit more indirect and less direct verbal teaching behaviors than did the closed-minded student teachers while leading junior high school social studies discussion lessons.

II. IMPLICATIONS OF THE STUDY

It appears that the strength of a student teacher's belief-disbelief system is an important factor in his classroom verbal teaching behavior. Relationships between open-mindedness and indirect teaching, and closed-mindedness and direct teaching were found. Further research regarding the predictive value of the Dogmatism Scale would seem to be worthwhile. The Dogmatism Scale appears to indicate those likely to teach indirectly and those likely to teach directly. This predictive value might be utilized in counseling student teachers, in training student teachers, or in the placing of student teachers with co-operating teachers.

The Dogmatism Scale, it seems, could also be utilized as a diagnostic tool in student teaching. The student teachers could be informed of their Dogmatism Scale score. The implications of this could be drawn to their attention, and to the attention of their instructors and supervisors.

III. RECOMMENDATIONS FOR FURTHER RESEARCH

Several questions arise as a result of this investigation. Some of these are presented below.

(1) Apart from the Dogmatism Scale, are there other predictors of indirect or direct classroom verbal behavior?

(2) Apart from classroom verbal behavior, is the Dogmatism Scale predictive of other aspects of teacher behavior?

(3) Findings reported here apply to social studies discussion lessons. Would similar findings be reported for different courses and for different types of lessons?

(4) Findings reported here apply to student teachers. Would similar findings be reported for teachers?

(5) Do these findings relate to achievement in student teaching?

(6) The subjects did not know their Dogmatism Scale score. If they knew their score and its implications, would this influence their verbal behavior in the classroom?

(7) The subjects did not see the matrices representing their classroom verbal behavior. Would analysis of the matrices in consultation with a supervisor result in changed classroom verbal behavior?

(8) Can open- or closed-mindedness be modified, and if so, how?

BIBLIOGRAPHY

BIBLIOGRAPHY

- Amidon, Edmund J. (director). The Effects of Teaching Interaction Analysis to Student Teachers. Project of Student Teaching, United States Department of Health, Education and Welfare, Cooperative Research Program, Project Number 2873, Philadelphia: Temple University, n.d.
- _____, and Flanders, Ned A. The Role of the Teacher in the Classroom. Minneapolis: Association for Productive Teaching, 1967.
- _____, and Flanders, Ned A. "The Effects of Direct and Indirect Teacher Influence on Dependent-Prone Students Learning Geometry," Journal of Educational Psychology, 52:286-291, 1961.
- _____, and Giammatteo, M. "The Verbal Behavior of Superior Teachers," Elementary School Journal, 65:283-285, February, 1965.
- _____, and Simon, Anita. "Implications for Teacher Education of Interaction Analysis Research in Student Teaching." Paper read at the Annual Meeting of the Educational Research Association of America, Chicago, February, 1965.
- Anderson, Harold H., and Brewer, Helen M. Studies of Teachers' Classroom Personalities, I: Dominative and Socially Integrative Behavior of Kindergarten Teachers. Stanford: Stanford University Press, 1945.
- _____, and Brewer, Joseph E. Studies of Teachers' Classroom Personalities, II: Effects of Teachers' Dominative and Integrative Contacts on Children's Classroom Behavior. Stanford: Stanford University Press, 1946a.
- _____, Brewer, Joseph E., and Reed, Mary Frances. Studies of Teachers' Classroom Personalities, III: Follow-up Studies of the Effects of Dominative and Integrative Contacts on Children's Behavior. Stanford: Stanford University Press, 1946b.
- Ferguson, George A. Statistical Analysis in Psychology and Education. New York: McGraw-Hill Book Co., 1966.
- Flanders, Ned A. "Personal-Social Anxiety as a Factor in Experimental Learning Situations," Journal of Educational Research, 45:100-110, October, 1951.

- _____. "Using Interaction Analysis in the Inservice Training of Teachers," Journal of Experimental Education, 30:313-316, June, 1962.
- _____. "Intent, Action and Feedback: A Preparation for Teaching," Journal of Teacher Education, 14:250-260, September, 1963.
- _____. "Some Relationships Between Teacher Influence, Pupil Attitudes, and Achievement," University of Michigan, Ann Arbor, 1962. (pre-publication manuscript.)
- _____. Teacher Influence, Pupil Attitudes, and Achievement. Cooperative Research Monograph, No.12. Washington, D.C.: U.S. Government Printing Office, 1965.
- _____. "The Problems of Observer Training and Reliability," Interaction Analysis: Theory, Research, and Application. Reading, Mass.: Addison-Wesley Publishing Company, 1967. Pp.158-166.
- Furst, Norma. "The Effects of Training in Interaction Analysis on the Behavior of Student Teachers in Secondary Schools." Paper read at the Annual Meeting of the American Educational Research Association, Chicago, February, 1965.
- Hough, John B., and Amidon, Edmund J. "The Relationship of Personality Structure and Training in Interaction Analysis to Attitude Change during Student Teaching." Paper read at the Annual Meeting of the American Educational Research Association, Chicago, February, 1965.
- _____, and Ober, Richard. "The Effect of Training in Interaction Analysis on the Verbal Behavior of Pre-Service Teachers," Interaction Analysis: Theory, Research, and Application. Reading, Mass.: Addison-Wesley Publishing Company, 1967. Pp.329-345.
- Kemp, C. Gratton. "Effect of Dogmatism on Critical Thinking," School Science and Mathematics, 60:314-319, March, 1960.
- _____. "Influence of Dogmatism on the Training of Counselors," Journal of Counseling Psychology, 9:155-157, May, 1962.
- _____. "Improvement of Critical Thinking in Relation to Open-Closed Belief Systems," Journal of Experimental Education, 31:321-323, March, 1963.
- Kirk, Jeffery, "Elementary School Student Teachers and Interaction Analysis," Interaction Analysis: Theory, Research, and Application. Reading, Mass.: Addison-Wesley Publishing Company, 1967, Pp. 299-306.

- Lippitt, Ronald, and White, Ralph K. "The Social Climate of Children's Groups," Child Behavior and Development. New York: McGraw-Hill Book Company, Inc., 1943, Pp. 485-508.
- Lohman, Ernest E. "A Study of the Effect of Pre-Service Training in Interaction Analysis on the Verbal Behavior of Student Teachers." Unpublished doctoral dissertation, Ohio State University, Columbus, 1966.
- Medley, Donald M., and Mitzel, Harold E. "Measuring Classroom Behavior by Systematic Observation," Handbook of Research on Teaching, Chicago: Rand McNally and Co., 1963. Pp.247-328.
- Moskowitz, Gertrude. "The Effect of Training in Interaction Analysis on the Attitudes and Teaching Patterns of Cooperating Teachers and their Student Teachers." Unpublished doctoral dissertation, Temple University, Philadelphia, 1966.
- Pankratz, Roger. "Verbal Interaction Patterns in the Classrooms of Selected Science Teachers: Physics." Unpublished doctoral dissertation, Ohio State University, Columbus, 1966.
- Rokeach, Milton. The Open and Closed Mind. New York: Basic Books, Inc., 1960.
- _____. Beliefs, Attitudes and Values. San Francisco: Jossey-Bass, Inc., 1968.
- _____. "Political and Religious Dogmatism: An Alternative to the Authoritarian Personality," Psychological Monographs, 70, No. 18, 1956.
- _____, and Fruchter, Benjamin. "A Factorial Study of Dogmatism and Related Concepts," Journal of Abnormal and Social Psychology, 53:356-360, February, 1956.
- Soar, Robert S. "Pupil Needs and Teacher-Pupil Relationships: Experiences Needed for Comprehending Reading," Interaction Analysis: Theory, Research, and Application, 1967. Pp.243-255.
- Withall, John. "The Development of a Technique for the Measurement of Social-Emotional Climate in the Classrooms," The Journal of Experimental Education, 17: 347-361. June, 1949.
- Zahn, Richard D. "The Use of Interaction Analysis in Supervising Student Teachers." Unpublished doctoral dissertation, Temple University, Philadelphia, 1965.

APPENDICES

APPENDIX A

ROKEACH DOGMATISM SCALE, FORM E

The following is a study of what the general public thinks and feels about a number of important social and personal questions. The best answer to each statement below is your personal opinion. We have tried to cover many different and opposing points of view; you may find yourself agreeing strongly with some of the statements, disagreeing just as strongly with others, and perhaps uncertain about others; whether you agree or disagree with any statement, you can be sure that many people feel the same as you do.

Mark each statement in the left margin according to how much you agree or disagree with it. Please mark every one.

Write +1, +2, +3, OR -1, -2, -3, depending on how you feel in each case.

+1:	I AGREE A LITTLE	-1:	I DISAGREE A LITTLE
+2:	I AGREE ON THE WHOLE	-2:	I DISAGREE ON THE WHOLE
+3:	I AGREE VERY MUCH	-3:	I DISAGREE VERY MUCH

- _____ (1) The United States and Russia have just about nothing in common.
- _____ (2) The highest form of government is a democracy and the highest form of democracy is a government run by those who are most intelligent.
- _____ (3) Even though freedom of speech for all groups is a worthwhile goal, it is unfortunately necessary to restrict the freedom of certain political groups.
- _____ (4) It is only natural that a person would have a much better acquaintance with ideas he believes in than with ideas he opposes.
- _____ (5) Man on his own is a helpless and miserable creature.
- _____ (6) Fundamentally, the world we live in is a pretty lonesome place.
- _____ (7) Most people just don't give a "damn" for others.
- _____ (8) I'd like it if I could find someone who would tell me how to solve my personal problems.
- _____ (9) It is only natural for a person to be rather fearful of the future.
- _____ (10) There is so much to be done and so little time to do it in.
- _____ (11) Once I get wound up in a heated discussion I just can't stop.
- _____ (12) In a discussion I often find it necessary to repeat myself several times to make sure I am being understood.
- _____ (13) In a heated discussion I generally become so absorbed in what I am going to say that I forget to listen to what the others are saying.
- _____ (14) It is better to be a dead hero than to be a live coward.
- _____ (15) While I don't like to admit this even to myself, my secret ambition is to become a great man, like Einstein, or Beethoven, or Shakespeare.
- _____ (16) The main thing in life is for a person to want to do something important.

- _____ (17) If given the chance I would do something of great benefit to the world.
- _____ (18) In the history of mankind there have probably been just a handful of really great thinkers.
- _____ (19) There are a number of people I have come to hate because of the things they stand for.
- _____ (20) A man who does not believe in some great cause has not really lived.
- _____ (21) It is only when a person devotes himself to an ideal or cause that life becomes meaningful.
- _____ (22) Of all the different philosophies which exist in this world there is probably only one which is correct.
- _____ (23) A person who gets enthusiastic about too many causes is likely to be a pretty "wishy-washy" sort of person.
- _____ (24) To compromise with our political opponents is dangerous because it usually leads to the betrayal of our own side.
- _____ (25) When it comes to differences of opinion in religion we must be careful not to compromise with those who believe differently from the way we do.
- _____ (26) In times like these, a person must be pretty selfish if he considers primarily his own happiness.
- _____ (27) The worst crime a person could commit is to attack publicly the people who believe in the same thing he does.
- _____ (28) In times like these it is often necessary to be more on guard against ideas put out by people or groups in one's own camp than by those in the opposing camp.
- _____ (29) A group which tolerates too much differences of opinion among its own members cannot exist for long.
- _____ (30) There are two kinds of people in this world: those who are for the truth and those who are against the truth.
- _____ (31) My blood boils whenever a person stubbornly refuses to admit he's wrong.

- _____(32) A person who thinks primarily of his own happiness is beneath contempt.
- _____(33) Most of the ideas which get printed nowadays aren't worth the paper they are printed on.
- _____(34) In this complicated world of ours the only way we can know what's going on is to rely on leaders or experts who can be trusted.
- _____(35) It is often desirable to reserve judgment about what's going on until one has had a chance to hear the opinions of those one respects.
- _____(36) In the long run the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own.
- _____(37) The present is all too often full of unhappiness. It is the future that counts.
- _____(38) If a man is to accomplish his mission in life it is sometimes necessary to gamble "all or nothing at all."
- _____(39) Unfortunately, a good many people with whom I have discussed important social and moral problems don't really understand what's going on.
- _____(40) Most people just don't know what's good for them.

APPENDIX B

OBSERVER RELIABILITY CHECKS

RELIABILITY CHECK ONE (OBSERVER)

R. ANDERSON AND KEYED TAPE

Category	Key	R. Anderson	% Key	R. Anderson	% Diff	(Ave.%) ²
1	0	0	0.0	0.0	0.0	0.000
2	9	10	3.3	3.6	0.3	0.12
3	30	27	10.9	9.7	1.2	0.06
4	21	19	7.6	6.9	0.7	0.53
5	33	32	12.0	11.6	0.4	1.39
6	26	32	9.5	11.6	2.1	1.11
7	13	12	4.7	4.3	0.4	0.20
8	20	18	7.3	6.5	0.8	0.48
9	114	118	41.6	42.6	1.0	17.72
10	8	9	2.9	3.2	0.3	0.09
Totals	274	277	99.8	100.0	7.2	21.70

Sample calculation of $\hat{\eta}$

$$\hat{\eta} = \frac{P_o - P_e}{100 - P_e} = \frac{(100 - 7.2) - 21.7}{78.3} = 0.908$$

RELIABILITY CHECK TWO (OBSERVER)

R. ANDERSON AND KEYED TAPE

Category	Key	R.Anderson	% Key	R.Anderson	% Diff	(Ave.%) ²
1	0	0	0.0	0.0	0.0	0.00
2	6	5	1.8	1.5	0.3	0.03
3	49	47	14.6	14.4	0.2	2.10
4	98	96	29.2	29.5	0.3	8.61
5	41	39	12.2	11.9	0.3	1.45
6	5	4	1.5	1.5	0.0	0.02
7	1	1	0.3	0.3	0.0	0.00
8	101	99	30.1	30.4	0.3	9.15
9	5	2	1.5	0.6	0.9	0.01
10	30	33	8.9	10.2	1.3	0.91
Totals	336	326	100.1	100.3	3.6	22.28

$$\bar{r} = 0.953$$

RELIABILITY CHECK THREE (OBSERVER)

H. ANDERSON AND KEYED TAPE

Category	Key	H. Anderson	% Key	H. Anderson	% Diff.	(Ave.%) ²
1	0	0	0.0	0.0	0.0	0.00
2	9	11	3.3	3.9	0.6	0.12
3	30	26	10.9	9.3	1.6	1.02
4	21	22	7.6	7.9	0.3	0.60
5	33	34	12.0	12.3	0.3	1.47
6	26	22	9.5	7.9	1.6	0.75
7	13	11	4.7	3.9	0.8	0.18
8	20	21	7.3	7.6	0.3	0.55
9	114	124	41.6	44.7	3.1	18.61
10	8	6	2.9	2.2	0.7	0.06
Totals	274	277	99.8	99.7	9.3	23.36

$$\pi = 0.878$$

RELIABILITY CHECK FOUR (OBSERVER)

H. ANDERSON AND KEYED TAPE

Category	Key	H. Anderson	% Key	H. Anderson	% Diff.	(Ave.%) ²
1	0	0	0.0	0.0	0.0	0.00
2	6	10	1.8	2.9	1.1	0.05
3	49	52	14.6	15.6	1.0	2.28
4	98	89	29.2	26.6	2.6	7.78
5	41	35	12.2	10.5	1.7	1.28
6	5	9	1.5	2.7	1.2	0.04
7	1	1	0.3	0.3	0.0	0.00
8	101	99	30.1	29.6	0.5	8.91
9	5	6	1.5	1.8	0.3	0.03
10	30	33	8.9	9.9	1.0	0.89
Totals	336	334	100.1	99.9	9.4	21.26

$$\hat{\eta} = 0.869$$

RELIABILITY CHECK FIVE (INTER-OBSERVER)

H. ANDERSON AND R. ANDERSON

Cate- gory			%	%	%	(Ave.%) ²
	H.Anderson	R.Anderson	H.Anderson	R.Anderson	Diff.	
1	0	0	0.0	0.0	0.0	0.00
2	10	5	2.9	1.5	1.4	0.05
3	52	47	15.6	14.4	1.2	2.25
4	89	96	26.6	29.5	2.9	7.87
5	35	39	10.5	11.9	1.4	1.25
6	9	4	2.7	1.5	0.2	0.04
7	1	1	0.3	0.3	0.0	0.00
8	99	99	29.6	30.4	0.8	9.00
9	6	2	1.8	0.6	1.2	0.01
10	33	33	9.9	10.2	0.3	1.01
Totals	334	326	99.9	100.3	9.4	21.48

Observer Agreement (π) = 0.880

RELIABILITY CHECK SIX (INTER-OBSERVER)

H. ANDERSON AND R. ANDERSON

Cate- gory	H. Anderson		R. Anderson		Diff.	(Ave.%) ²
	H. Anderson	R. Anderson	H. Anderson	R. Anderson		
1	0	0	0.0	0.0	0.0	0.00
2	11	10	3.9	3.6	0.3	0.14
3	26	27	9.3	9.7	0.4	0.90
4	22	19	7.9	6.9	1.0	0.55
5	34	32	12.3	11.6	0.7	1.43
6	22	32	7.9	11.6	3.7	0.95
7	11	12	3.9	4.3	0.4	0.17
8	21	18	7.6	6.5	1.1	0.50
9	124	118	44.7	42.6	2.1	19.05
10	6	9	2.2	3.2	1.0	0.07
Totals	277	277	99.7	100.0	10.7	23.76

Observer Agreement ($\hat{\kappa}$) = 0.859

RELIABILITY CHECK SEVEN (STABILITY)

STABILITY OF R. ANDERSON

Category	A Tally of a taped lesson	B Tally of identi- cal taped lesson 3 weeks later	% A	% B	% Diff.	(Ave.%) ²
1	0	0	0.0	0.0	0.0	0.00
2	5	6	1.5	1.8	0.3	0.03
3	47	48	14.4	14.5	0.1	2.09
4	96	99	29.5	29.9	0.4	8.82
5	39	36	11.9	10.9	1.0	1.30
6	4	6	1.5	1.8	0.3	0.03
7	1	1	0.3	0.3	0.0	0.00
8	99	100	30.4	30.2	0.2	9.18
9	2	4	0.6	1.2	0.6	0.01
10	33	31	10.2	9.4	0.8	0.96
Totals	326	331	100.3	100.0	3.7	22.42

$$\bar{r} = 0.952$$

RELIABILITY CHECK EIGHT (INTER-OBSERVER)

CLASSROOM OBSERVATION BY TWO OBSERVERS

Cate- gory			%	%	%	(Ave.%) ²
	H.Anderson	R.Anderson	H.Anderson	R.Anderson	Diff.	
1	1	0	0.2	0.0	0.2	0.00
2	33	37	8.1	9.1	1.0	0.09
3	25	26	6.1	6.4	0.3	0.39
4	29	19	7.1	4.7	2.4	0.34
5	59	59	14.4	14.5	0.1	2.08
6	0	0	0.0	0.0	0.0	0.00
7	0	0	0.0	0.0	0.0	0.00
8	6	9	1.5	2.2	0.7	0.03
9	251	249	61.5	61.3	0.2	37.70
10	4	7	1.0	1.7	0.7	0.01
Totals	408	406	99.9	99.9	5.6	40.64

Observer Agreement ($\hat{\kappa}$) = 0.905

RELIABILITY CHECK NINE (INTER-OBSERVER)

CLASSROOM OBSERVATION BY TWO OBSERVERS

Cate- gory			%	%	%	(Ave.%) ²
	H.Anderson	R.Anderson	H.Anderson	R.Anderson	Diff.	
1	0	0	0.0	0.0	0.0	0.00
2	69	71	16.7	17.1	0.4	2.85
3	37	38	8.9	9.2	0.3	0.82
4	57	47	13.8	11.3	2.5	1.57
5	93	98	22.6	23.4	0.8	5.29
6	1	1	0.2	0.2	0.0	0.00
7	4	2	1.0	0.5	0.5	0.01
8	91	92	22.1	22.1	0.1	4.90
9	51	55	12.4	13.3	0.9	1.65
10	9	10	2.2	2.4	0.2	0.05
Totals	412	414	99.9	99.6	5.7	17.14

Observer Agreement (\bar{r}) = 0.931

RELIABILITY CHECK TEN (INTER-OBSERVERS)

CLASSROOM OBSERVATION BY TWO OBSERVERS

Cate- gory			% %		% %		(Ave.%) ²
	H. Anderson	R. Anderson	H. Anderson	R. Anderson	Diff.		
1	0	0	0.0	0.0	0.0	0.00	
2	27	25	6.9	6.3	0.6	0.43	
3	6	5	1.5	1.2	0.3	0.01	
4	35	29	8.9	7.3	1.6	0.66	
5	48	60	12.2	15.0	2.8	1.84	
6	21	18	5.3	4.5	0.8	0.24	
7	48	49	12.2	12.3	0.1	1.50	
8	72	65	18.3	16.3	2.0	2.99	
9	91	92	23.1	23.1	0.0	5.33	
10	45	56	11.4	14.0	2.6	1.61	
Totals	393	399	99.8	100.0	10.8	14.61	

Observer Agreement ($\hat{\kappa}$) = 0.873

APPENDIX C

INDIVIDUAL PERCENTAGE MATRICES
OF OPEN-MINDED AND CLOSED-MINDED
STUDENT TEACHERS

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER ONE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.12	0.00
2	0.00	0.12	2.49	1.74	1.00	0.12	0.00	0.00	3.23	0.75
3	0.00	0.00	0.87	1.00	1.00	0.00	0.00	0.87	2.49	0.12
4	0.00	0.00	0.00	2.24	0.25	0.00	0.00	4.60	1.37	1.37
5	0.12	0.00	0.00	1.99	8.21	0.00	0.00	0.62	4.85	0.87
6	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.25	0.12	0.00
7	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.12	0.00	0.00
8	0.00	3.48	1.24	.62	1.24	0.12	0.25	2.36	0.75	0.50
9	0.12	5.60	2.49	.62	4.35	0.12	0.00	0.00	26.99	0.50
10	0.00	0.25	0.25	1.49	0.50	0.00	0.00	0.75	0.87	0.50
Total	0.25	9.45	7.34	9.83	16.42	0.50	0.25	10.57	40.80	4.60

PERCENTAGE MATRIX OF OPEN-MINDED

SUBJECT NUMBER TWO

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.25	6.28	3.45	2.59	0.00	0.12	2.96	0.37	0.37
3	0.00	0.00	2.22	2.34	1.97	0.00	0.00	2.59	0.74	0.49
4	0.00	0.00	0.00	2.71	0.00	0.00	0.00	8.25	0.25	2.83
5	0.00	0.00	0.00	4.31	12.81	0.00	0.00	0.49	1.60	0.74
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00
7	0.00	0.00	0.00	0.12	0.12	0.00	0.00	0.00	0.00	0.00
8	0.00	13.92	1.23	0.49	0.25	0.12	0.12	6.53	0.96	0.49
9	0.00	1.85	0.49	0.12	1.35	0.00	0.00	0.00	4.93	0.25
10	0.00	0.37	0.12	0.49	0.86	0.00	0.00	3.08	0.25	0.74
Total	0.00	16.38	10.34	14.04	19.95	0.12	0.25	24.01	8.99	5.91

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER THREE

Category	1	2	3	4	5	6	7	8	9	10
1	0.12	0.00	0.00	0.12	0.25	0.00	0.00	0.00	0.00	0.00
2	0.00	0.25	2.09	0.98	0.98	0.00	0.00	0.49	0.98	0.37
3	0.00	0.12	2.34	1.11	1.97	0.00	0.00	3.08	3.94	0.86
4	0.00	0.12	0.00	3.08	0.74	0.12	0.00	6.65	1.23	1.23
5	0.00	0.37	0.12	3.33	11.82	0.12	0.00	0.74	1.72	0.86
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	0.12	0.12
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.12	2.83	4.56	2.09	0.49	0.25	0.00	2.09	1.11	0.62
9	0.25	2.34	3.94	0.74	2.09	0.00	0.00	0.12	15.15	0.49
10	0.00	0.12	0.37	1.72	0.74	0.25	0.00	0.49	0.86	3.08
Total	0.49	6.16	13.42	13.18	19.09	0.74	0.00	14.16	25.12	7.64

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER FOUR

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.38	0.63	1.50	0.38	0.00	0.00	0.13	0.13	0.50
3	0.00	0.75	2.26	0.38	0.63	0.00	0.00	1.26	0.75	0.25
4	0.00	0.00	0.00	4.64	0.75	0.00	0.00	3.88	0.88	6.14
5	0.00	0.13	0.00	2.38	4.61	0.00	0.00	0.00	0.13	0.88
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	1.00	1.13	1.75	0.13	0.00	0.00	8.52	1.63	1.38
9	0.00	1.13	2.01	1.13	0.00	0.00	0.00	0.13	27.07	1.00
10	0.00	0.25	0.25	4.51	1.63	0.00	0.00	1.63	1.88	7.52
Total	0.00	3.63	6.27	16.29	8.16	0.00	0.00	15.54	32.46	17.67

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER FIVE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.13	0.00	0.13	0.00	0.00	0.13	0.00	0.00
2	0.00	0.00	1.50	1.88	0.50	0.00	0.00	0.63	1.75	0.63
3	0.00	0.38	3.26	1.50	1.00	0.00	0.00	1.88	1.63	0.75
4	0.00	0.13	0.13	5.64	0.88	0.00	0.00	4.64	2.38	2.63
5	0.25	0.00	0.00	2.51	5.26	0.00	0.00	0.13	0.63	0.63
6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
7	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.13	0.00	0.13
8	0.13	3.13	2.01	0.88	0.13	0.00	0.25	0.63	1.63	0.13
9	0.00	3.13	3.01	1.25	0.38	0.13	0.00	0.13	30.95	0.75
10	0.00	0.13	0.38	2.63	1.13	0.00	0.13	0.63	0.63	1.75
Total	0.38	6.89	10.40	16.42	9.40	0.13	0.38	8.90	39.72	7.39

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER SIX

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.50	2.26	0.88	0.00	0.00	1.00	1.50	2.38
3	0.00	0.38	1.00	1.50	0.88	0.00	0.00	2.13	1.25	0.50
4	0.00	0.00	0.13	4.76	0.38	0.13	0.00	7.64	1.50	4.14
5	0.00	0.00	0.00	2.38	8.52	0.00	0.00	0.75	0.88	1.13
6	0.00	0.00	0.00	0.00	0.13	0.13	0.00	0.13	0.13	0.50
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	5.26	3.51	1.75	1.13	0.25	0.00	3.88	0.88	1.75
9	0.00	2.63	2.13	1.38	0.63	0.00	0.00	0.00	8.27	0.13
10	0.00	0.25	0.38	4.64	1.13	0.50	0.00	2.88	0.75	6.39
Total	0.00	8.52	7.64	18.67	13.66	1.00	0.00	18.42	15.16	16.92

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER SEVEN

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.13	1.00	2.51	3.01	0.75	0.00	0.13	0.63	3.63	0.38
3	0.00	0.38	2.13	2.00	0.50	0.00	0.00	1.13	4.14	0.63
4	0.00	0.00	0.38	5.26	0.38	0.00	0.00	4.01	4.26	0.63
5	0.00	0.00	0.00	1.26	3.38	0.13	0.00	0.38	1.75	0.38
6	0.00	0.00	0.00	0.13	0.00	0.13	0.00	0.13	0.00	0.00
7	0.00	0.00	0.00	0.13	0.00	0.00	0.38	0.13	0.38	0.13
8	0.00	2.38	1.50	1.00	0.50	0.00	0.13	1.26	1.26	0.00
9	0.00	8.27	4.13	1.26	1.38	0.00	0.38	0.00	24.81	1.00
10	0.00	0.13	0.13	0.88	0.38	0.13	0.13	0.38	1.00	0.75
Total	0.13	12.15	10.90	14.91	7.27	0.38	1.13	8.02	41.23	3.88

PERCENTAGE MATRIX OF OPEN-MINDED
SUBJECT NUMBER EIGHT

Category	1	2	3	4	5	6	7	8	9	10
1	0.13	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.37	0.00
2	0.00	0.26	1.38	1.50	1.00	0.13	0.00	0.26	1.13	0.13
3	0.00	0.37	2.01	0.88	1.38	0.00	0.00	1.13	1.75	0.50
4	0.00	0.00	0.00	5.14	0.13	0.13	0.00	3.26	1.50	2.38
5	0.00	0.37	0.13	2.38	12.15	0.37	0.00	0.26	1.38	0.63
6	0.00	0.00	0.00	0.13	0.13	0.00	0.00	0.00	0.26	0.26
7	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00
8	0.13	2.51	2.01	0.26	0.26	0.00	0.00	2.13	0.37	0.26
9	0.26	2.13	2.38	1.26	1.75	0.13	0.13	0.00	26.44	2.63
10	0.13	0.13	0.13	0.88	0.75	0.00	0.00	0.88	3.88	2.76
Total	0.63	5.76	8.02	12.53	17.67	0.75	0.13	7.89	37.09	9.52

PERCENTAGE MATRIX OF OPEN-MINDED

SUBJECT NUMBER NINE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.60	2.27	3.46	1.55	0.00	0.00	3.34	1.55	0.36
3	0.00	0.60	3.93	2.15	1.07	0.00	0.00	1.55	2.86	0.36
4	0.00	0.36	0.00	3.82	0.84	0.00	0.00	7.99	3.34	1.67
5	0.00	0.00	0.12	3.34	11.10	0.00	0.00	0.24	0.36	0.24
6	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.24	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	8.47	2.63	1.91	0.24	0.12	0.00	5.61	0.36	0.24
9	0.00	3.10	3.34	1.67	0.36	0.12	0.00	0.00	8.11	0.12
10	0.00	0.00	0.24	1.55	0.24	0.12	0.00	0.60	0.24	1.19
Total	0.00	13.13	12.53	18.02	15.39	0.36	0.00	19.57	16.83	4.18

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER ONE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
2	0.00	0.13	0.88	1.88	1.13	0.25	0.00	0.88	0.63	0.50
3	0.00	0.00	0.38	0.50	0.25	0.25	0.13	0.13	0.38	0.13
4	0.00	0.00	0.00	0.75	0.63	0.00	0.38	5.25	2.13	1.25
5	0.00	0.00	0.00	2.75	7.25	1.63	1.00	1.00	2.25	2.75
6	0.00	0.13	0.00	0.13	0.88	0.50	0.13	1.38	1.00	0.50
7	0.00	0.00	0.00	0.63	0.38	0.38	1.50	1.13	2.00	1.38
8	0.00	4.76	0.63	1.38	1.38	0.38	1.13	8.00	0.00	1.38
9	0.13	1.00	0.00	0.88	4.88	0.88	1.38	0.00	9.25	1.38
10	0.00	0.25	0.25	1.50	1.88	0.38	1.75	1.25	2.00	2.50
Total	0.13	6.25	2.13	10.38	18.63	4.63	7.38	19.00	19.75	11.75

PERCENTAGE MATRIX OF CLOSED-MINDED
SUBJECT NUMBER TWO

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.37	1.11	1.73	1.23	0.00	0.12	0.99	1.85	0.49
3	0.00	0.37	1.98	0.37	0.49	0.00	0.25	1.98	1.85	0.62
4	0.00	0.12	0.00	1.85	0.99	0.00	0.49	5.80	1.11	1.73
5	0.00	0.00	0.00	2.72	11.85	0.12	0.37	1.36	2.96	0.74
6	0.00	0.00	0.00	0.12	0.25	0.37	0.37	0.86	1.11	0.25
7	0.00	0.00	0.12	0.74	0.49	0.62	1.23	0.25	1.48	0.99
8	0.12	3.58	2.84	1.23	1.36	0.74	0.49	2.35	0.86	0.74
9	0.00	3.33	1.73	1.98	2.22	0.37	1.36	0.00	7.65	0.86
10	0.00	0.12	0.12	1.48	1.48	0.86	0.99	0.74	0.86	2.35
Total	0.12	7.90	7.90	12.34	20.12	3.33	5.68	14.32	19.51	8.77

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER THREE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.50	1.24	0.62	2.11	0.12	0.00	0.87	1.99	0.87
3	0.00	0.25	0.74	0.37	0.62	0.00	0.00	0.25	0.25	0.50
4	0.00	0.00	0.00	2.11	0.50	0.00	0.00	3.23	1.24	2.48
5	0.00	0.00	0.00	2.61	13.15	0.62	0.00	0.37	0.99	1.61
6	0.00	0.00	0.00	0.25	0.50	0.25	0.00	0.12	0.12	0.25
7	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00
8	0.00	3.85	0.62	0.12	0.12	0.12	0.12	9.43	0.87	1.86
9	0.00	3.23	0.25	0.99	0.74	0.12	0.00	0.12	22.46	1.36
10	0.00	0.50	0.12	2.36	1.61	0.25	0.00	2.73	1.36	2.85
Total	0.00	8.31	2.98	9.55	19.35	1.49	0.12	17.12	29.28	11.79

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER FOUR

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.98	1.96	0.49	0.00	0.00	0.73	0.73	0.00
3	0.00	0.12	0.73	1.59	1.35	0.00	0.00	2.08	0.37	0.37
4	0.00	0.24	0.00	2.82	1.10	0.00	0.12	7.10	3.06	1.47
5	0.00	0.00	0.12	2.08	4.90	0.12	0.00	0.49	1.59	0.24
6	0.00	0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.37	0.00
7	0.00	0.00	0.00	0.00	0.12	0.12	0.61	0.24	0.61	0.24
8	0.00	3.06	2.20	2.69	0.24	0.12	0.12	4.90	2.20	0.49
9	0.00	1.35	2.20	3.18	1.10	0.12	0.73	0.00	28.89	1.84
10	0.00	0.12	0.24	1.59	0.24	0.00	0.37	0.49	1.59	0.49
Total	0.00	4.90	6.61	15.91	9.55	0.49	1.96	16.03	39.41	5.14

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER FIVE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.12	0.24	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.12	1.95	2.19	2.68	0.00	0.12	0.72	0.49	0.49
3	0.12	0.00	1.46	1.58	1.34	0.00	0.00	1.58	0.12	0.61
4	0.00	0.00	0.12	8.88	0.72	0.61	0.36	9.73	0.85	2.80
5	0.12	0.00	0.12	4.26	19.34	0.12	0.00	1.09	0.72	0.85
6	0.00	0.00	0.00	0.36	0.00	0.00	0.00	0.49	0.00	0.24
7	0.00	0.00	0.00	0.97	0.24	0.00	0.24	0.36	0.00	0.24
8	0.00	7.91	2.80	2.07	0.97	0.36	0.85	4.01	0.12	0.36
9	0.12	0.72	0.24	0.61	0.49	0.00	0.24	0.00	1.46	0.00
10	0.00	0.00	0.00	2.92	0.85	0.00	0.24	1.46	0.12	1.22
Total	0.36	8.76	6.81	24.09	26.64	1.09	2.07	19.46	3.89	6.81

PERCENTAGE MATRIX OF CLOSED-MINDED
SUBJECT NUMBER SIX

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.75	1.25	0.25	0.00	0.00	0.50	0.38	0.25
3	0.00	0.00	0.38	0.38	0.63	0.00	0.00	0.25	0.63	0.13
4	0.00	0.00	0.00	10.40	0.50	0.00	0.00	5.14	1.38	3.38
5	0.00	0.00	0.00	2.76	8.02	0.38	0.00	0.13	0.38	0.13
6	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.13	0.00	0.13
7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
8	0.00	1.88	0.75	2.38	0.63	0.00	0.00	12.53	2.51	0.75
9	0.00	1.00	0.50	1.88	0.50	0.25	0.13	0.25	24.44	1.88
10	0.00	0.50	0.00	1.75	0.88	0.00	0.00	2.51	1.00	2.00
Total	0.00	3.38	2.38	20.80	11.78	0.63	0.13	21.43	30.83	8.65

PERCENTAGE MATRIX OF CLOSED-MINDED
SUBJECT NUMBER SEVEN

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.13	0.25	0.87	1.63	0.00	0.00	0.25	1.00	0.25
3	0.00	0.00	0.50	0.63	0.87	0.00	0.00	1.50	1.50	0.13
4	0.00	0.00	0.13	4.39	0.25	0.00	0.00	6.14	0.50	2.26
5	0.00	0.50	0.00	3.76	21.68	0.38	0.00	0.38	3.26	1.50
6	0.00	0.00	0.00	0.00	0.25	0.50	0.00	0.50	0.13	0.00
7	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.13	0.13	0.00
8	0.00	2.63	2.38	2.38	1.50	0.25	0.25	6.27	0.63	0.75
9	0.00	1.00	1.88	0.38	3.76	0.00	0.13	0.13	12.66	0.25
10	0.00	0.13	0.00	1.25	1.50	0.13	0.00	1.75	0.38	1.25
Total	0.00	4.39	5.14	13.66	31.45	1.38	0.38	17.04	20.18	6.39

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER EIGHT

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.84	5.13	0.95	0.00	0.00	1.79	0.60	0.48
3	0.00	0.00	0.12	1.67	0.48	0.00	0.12	2.86	0.60	0.00
4	0.00	0.00	0.00	2.51	0.36	0.36	0.12	18.38	0.72	1.91
5	0.00	0.00	0.00	2.74	2.51	0.00	0.00	1.43	0.72	0.60
6	0.00	0.00	0.00	0.00	0.12	0.12	0.00	1.07	0.24	0.60
7	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.60	0.00	0.00
8	0.00	8.71	4.01	9.07	2.39	1.19	0.48	8.11	0.84	0.84
9	0.00	1.07	1.07	1.07	0.84	0.12	0.00	0.12	4.30	0.00
10	0.00	0.00	0.00	2.15	0.36	0.24	0.00	1.07	0.60	0.72
Total	0.00	9.79	5.85	24.34	8.00	2.15	0.72	35.44	8.60	5.13

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER NINE

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.88	1.13	2.00	3.76	0.00	0.00	0.25	0.25	1.00
3	0.00	0.00	0.25	0.13	0.88	0.00	0.00	0.50	0.00	0.25
4	0.00	0.25	0.00	5.51	1.13	0.00	0.00	6.14	0.13	4.89
5	0.00	0.00	0.00	5.51	28.07	0.63	0.00	0.50	0.13	2.00
6	0.00	0.13	0.00	0.13	0.00	0.00	0.00	0.88	0.13	0.00
7	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.13	0.00	0.00
8	0.00	6.77	0.38	1.25	0.88	0.25	0.13	6.64	0.38	1.25
9	0.00	0.75	0.13	0.13	0.25	0.00	0.00	0.00	1.25	0.00
10	0.00	0.50	0.13	3.38	1.75	0.38	0.13	2.88	0.38	2.38
Total	0.00	9.27	2.00	18.05	36.84	1.25	0.25	17.92	2.51	11.90

PERCENTAGE MATRIX OF CLOSED-MINDED

SUBJECT NUMBER TEN

Category	1	2	3	4	5	6	7	8	9	10
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.63	0.50	1.50	0.00	0.00	0.63	1.25	0.63
3	0.00	0.25	0.75	0.38	0.25	0.13	0.00	1.13	1.38	0.38
4	0.00	0.13	0.00	1.00	0.38	0.00	0.00	4.26	0.50	2.38
5	0.00	0.00	0.13	1.50	18.80	0.13	0.00	0.88	1.50	1.75
6	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.25	0.38	0.00
7	0.00	0.00	0.00	0.13	0.00	0.13	0.50	0.25	0.00	0.63
8	0.00	2.51	1.25	1.38	1.13	0.13	0.25	7.27	1.25	1.63
9	0.00	1.75	1.75	0.88	1.13	0.13	0.13	0.38	16.04	1.25
10	0.00	0.50	0.13	2.76	1.50	0.13	0.75	1.75	1.13	5.64
Total	0.00	5.14	4.64	8.65	24.69	0.75	1.63	16.79	23.43	14.29

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